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FISHERY RESEARCH AND EDUCATIONAL INSTITUTIONS

IN NORTH AND SOUTH AMERICA

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FISHERIES DIVISION OF FAO

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
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FOREWORD

The Fisheries Division of the Food and Agriculture Organization of the United Nations is collecting information on world fishery research and educational institutions. The present publication summarizes the information gathered for North and South America, listing the government agencies and other institutions engaged in fishery research (biological and technological) and education. It briefly outlines their activities, lists publications issued, and gives the title and name, when known, of the senior fishery officer of each organization.

As is the case for most catalogues, detailed information becomes obsolete as a result of changing conditions. For this reason, the general program or over-all investigations are outlined for each institution or organization, rather than going into the details of the work conducted.

This directory is designed to encourage the exchange of information about comparable research problems and to acquaint workers in one area with the number, types, and programs of institutions in other regions. It should be particularly useful to the institutions and governments of nations with less developed fishing wishing to contact similar organizations in the more developed countries, so that they may profit by the experience of the latter. In addition, it may be of assistance to nations not carrying on fishery research if they are planning to organize such research programs.

Few universities and colleges, even in the more advanced fishing nations, offer specialized training in fisheries. These schools are listed with a brief outline of the type of training offered. With this information, prospective students will receive some guidance in selecting institutions offering the specialized training they desire.

The information contained herein was obtained largely from annual reports and supplemented by personal inquiries. Undoubtedly, some omissions and inaccuracies occur, more especially in Latin America. Some countries do not carry on fishery research, as far as can be determined, and hence do not appear in the catalogue. Some marine laboratories are omitted because their investigations are only remotely connected with fisheries. In addition, organizations

doing research exclusively with game or sport fish are omitted in most instances.

Because there are few institutions in Latin America devoting attention to fishery research, a number of museums are included. This, however, should not be interpreted as a complete list of museums doing work in fish taxonomy and faunal studies.

ACKNOWLEDGEMENTS

Appreciation is expressed to the officers of the many government agencies, universities, and research institutions and other individuals who willingly supplied information during the preparation of this catalogue. In particular, sincere thanks are extended to Messrs. A.W. Anderson and P.E. Thompson of the United States Fish and Wildlife Service, Dr. A.L. Pritchard of the Canadian Department of Fisheries, Dr. Pedro de Azevedo of the State of São Paulo Division of Fish and Game, and colleagues of the FAO Fisheries Division for assistance and suggestions.

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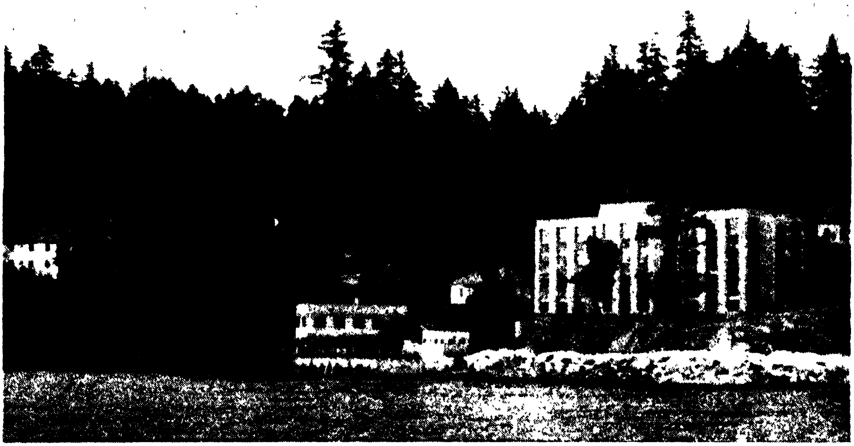
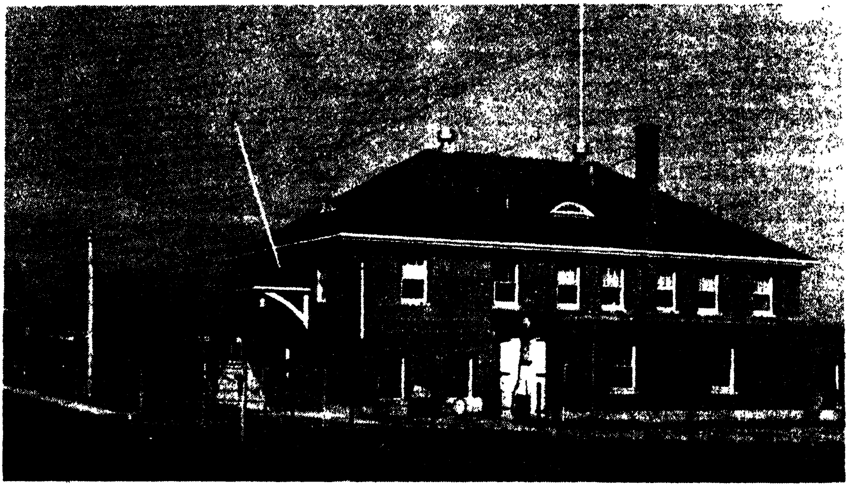


Pacific Biological Station of the Fisheries Research Board of Canada, Nanaimo, British Columbia. This station is devoted almost entirely to commercial fisheries research. The large building, opened in 1950, houses the administration office and the biological laboratories.



Gaspé Bay Fisheries Experimental Station of the Fisheries Research Board of Canada, Grande-Rivière, Quebec. This station is devoted to technological research concerned with the handling and preservation of fishery products.

NORTH AMERICA

CANADA

Federal Government Agencies

Almost all fishery research carried on by the Federal Government in Canada is the responsibility of the Fisheries Research Board of Canada, the scientific arm of the Department of Fisheries. Some problems in connection with fish culture are undertaken by the Fish Culture Development Branch of the Department of Fisheries. The Dominion Wildlife Service of the Department of Resources and Development operates in the National Parks, conducting investigations concerned with sport fish.

Organized fishery research in Canada had its origin in the work of the Marine Biological Laboratory founded in 1899 by the Fisheries Branch of the Department of Marine and Fisheries, the predecessor to the Department of Fisheries. The work, initiated by the volunteer workers of the laboratory which was located at St. Andrews, New Brunswick, consisted of studies to determine the food of economically important fish, life history investigations, and faunal studies of the area. The Fishereis Branch, later in 1901 and 1905, arranged for similar investigations and the establishment of laboratories on Lake Huron in Ontario and at Nanaimo, British Columbia. These laboratories and their operations were supervised by a managing board which was the forerunner of the Biological Board of Canada founded by the Canadian Parliament in 1912 and now known as the Fisheries Research Board of Canada.

FISHERIES RESEARCH BOARD OF CANADA (Ottawa, Ontario)

The Fisheries Research Board of Canada operates under the control of the Minister of Fisheries. In effect, the Board serves as the scientific arm of the Department of Fisheries.

Present organization of the Fisheries Research Board of Canada dates from 1937. The Board comprises fifteen members, consisting of nine scientists, four representatives of the fishing industry, and two representatives of the Department of Fisheries. Each member is appointed for a period of five years by the Minister of Fisheries. Members of the Board are not paid, but are reimbursed for expenses incurred in the performance of their official duties.

The Board members meet annually to decide on programs of work and to elect officers. Supervision of the research at the seven stations is in the hands of an executive committee with several subcommittees. Each station is administered by a director. The directors and their staffs are appointed by the Board on the approval of the Minister of Fisheries.

Of the seven research stations, four are located on the Atlantic Coast, one in the Province of Manitoba, and two on the Pacific Coast. Three of the seven are concerned with technological research and the remainder carry on biological investigations.

The Board's biological research program is designed to obtain the knowledge of the fisheries resources necessary to exploit them to the greatest possible advantage. It covers the following main features: exploratory fishing to discover new resources; population studies to determine the effects of fishing and causes of natural fluctuations and their relationships; disease studies to determine the extent to which diseases normally reduce populations; investigations to determine the feasibility of increasing production through fish culture, reduction of predators, fertilization, stream improvement, and other means; studies of optimum size for different species to give the maximum yield; oceanographic work to learn the relationship between environment and availability; and experimental fishing with various gears to lower costs of production. The Board operates five research vessels for the exploratory and experimental fishing and the other phases of research. The technological research work is designed to improve the quality of fishery products, to improve methods of processing and preserving fish, to study the nutritive value of fish, and to increase the range and value of fishery by-products for food, medicinal, and industrial uses.

The research stations, the principal biological investigations, and the number of scientists engaged as of the date indicated were as follows:

Biological Stations

1. Atlantic Biological Station (St. Andrews, New Brunswick).
Scientific personnel (1949): 17 full-time, 12 seasonal.
Investigations concerned with: seal, Atlantic salmon, herring, lobster, shrimp, oyster, shellfish poisoning, scallops, bar clam, groundfish, tuna, billfish, smelt, and trout.

2. Newfoundland Biological Station (St. John's, Newfoundland).
Scientific personnel (1949): 6 full-time, 3 seasonal.
Investigations concerned with: groundfish and salmon.

3. Central Fisheries Research Station (Winnipeg, Manitoba).
Scientific personnel (1949): 5 full-time, 14 seasonal.
Investigations concerned with: population studies in Great Slave Lake, fresh-water species and their parasites, and the beluga whale of Hudson Bay.

4. Pacific Biological Station (Nanaimo, British Columbia).
Scientific personnel (1949): 31 full-time, 7 seasonal.
Investigations concerned with: Pacific salmon, groundfish, herring, pilchard, anchovy, eulachon, albacore, whale, crab, and shrimp.

For several years, the Fisheries Research Board has been carrying on biological investigations in the Eastern Arctic during the summer months. Headquarters for the work is McGill University.

5. Eastern Arctic Investigations (McGill University, Montreal, Quebec).
Scientific personnel (1950): 5 seasonal.
Investigations concerned with: studies of the fish fauna and oceanography of the Eastern Arctic.

Technological Stations

1. Atlantic Fisheries Experimental Station (Halifax, Nova Scotia).
Scientific personnel (1949): 28 full-time, 17 seasonal.

2. Gaspé Bay Fisheries Experimental Station (Grande-Rivière, Quebec).
   Scientific personnel (1949): 7 full-time, 5 seasonal.

3. Pacific Fisheries Experimental Station (898 Richards St., Vancouver, British Columbia).
   Scientific personnel (1949): 13 full-time.

Apart from these operations, the Fisheries Research Board carries on physical and chemical oceanographic work through a joint arrangement with the Royal Canadian Navy, the Hydrographic Service, and the National Research Council which is known as the Canadian Joint Committee on Oceanography. The Committee maintains the Atlantic and Pacific Oceanographic Groups located respectively at the Atlantic Biological Station and the Pacific Biological Station of the Fisheries Research Board. Each group had two scientists and several seasonal workers in 1949.

Publications

(1) Annual Report: Summary of activities.
(2) Progress Reports of the Pacific Stations (irregular): Brief articles on investigations at the Pacific stations.
(3) Progress Reports of the Atlantic Stations (irregular): Brief articles on investigations at the Atlantic stations.
(4) Bulletin (irregular): Authoritative accounts of particular subjects either from the technical or from the popular viewpoint.
(5) Journal (irregular): Technical papers on results of investigations.
(6) Canadian Atlantic Fauna (irregular).
(7) Canadian Pacific Fauna (irregular).
(8) Circular (irregular): Information of general nature of particular interest to the fishing industry issued by the various stations.

Senior Officer

Executive Director (1950): D. H. Sutherland.

DEPARTMENT OF FISHERIES (Ottawa, Ontario)

The only phase of fishery research undertaken by the Department of Fisheries is that concerned with fish culture and marketing. The fish culture work is carried on by the Fish Culture Development Branch of the Conservation and Development Service. The Branch operates trout and salmon hatcheries in Eastern Canada. Research work is concerned with the improvement of methods of artificial propagation and stocking used by these establishments. On the West Coast, the Branch has a stream improvement program in progress, designed to improve the spawning areas in salmon streams. In co-operation with the Fisheries Research Board of Canada, it is also conducting oyster culture investigations in Prince Edward Island, Nova Scotia, and New Brunswick.

Economic studies on costs, employment, prices, marketing, etc., are carried on by the Market and Economic Service.

Publications

(1) Annual Report: Summary of activities and the state of the fisheries.

(2) Fisheries Department Trade News (monthly): Review of developments and news of interest to the industry (including research data).

(3) The Canadian Fish Culturist (irregular): Bulletin of information and opinion as to fish culture in Canada.

(4) Market Bulletin (irregular): Outlook for marketing of fisheries products.

(5) Publications dealing with fisheries production statistics are published by the Dominion Bureau of Statistics of the Department of Trade and Commerce.

Senior Officer

Deputy Minister of Fisheries (1950): Stewart Bates.

Provincial Government Agencies

With the exception of the Provinces of Ontario and Quebec, the governments of the ten Canadian Provinces are not actively engaged in fishery research. The Provinces of Alberta, British Columbia, Manitoba, and Saskatchewan sponsor biological research to a minor extent, but New Brunswick, Newfoundland, Nova Scotia, and Prince Edward Island do not carry on commercial fishery investigations. The Nova Scotia Department of Trade and Industry does some work with fresh-water game fish.

The provinces and the government agencies concerned with fishery research are listed with a brief account of the work done.

ALBERTA

FISH AND GAME BRANCH, DEPARTMENT OF LANDS AND MINES (Edmonton)

Biological research, mainly limnological studies and creel census work, for the Fish and Game Branch of the Department of Lands and Mines, is handled by the teaching and research staff of the Department of Zoology of the University of Alberta, and is usually seasonal.

Publications
(1) Miscellaneous circulars (irregular):

Senior Officer
Superintendent of Fisheries (1950): H. B. Watkins.

BRITISH COLUMBIA

DEPARTMENT OF FISHERIES (Victoria)

The Department of Fisheries employs at least one biologist who is engaged in oyster work, principally on investigations dealing with oyster culture. From time to time, the Department engages staff members or students of the Department of Zoology of the University of British Columbia to make short investigations on particular fishery problems. It occasionally contributes financially to the work of the Pacific Biological Station of the Fisheries Research Board of Canada for particular research projects. The British Columbia Game Commission (Vancouver) is responsible for research problems concerned with the fresh-water game fisheries.

Publications
(1) Annual Report: Summary of activities and the state of fisheries. Also contains biological contributions from various government agencies, including papers prepared by the Fisheries Research Board staff.

Senior Officer
Deputy Minister of Fisheries (1950): G. J. Alexander.

MANITOBA

GAME AND FISHERIES BRANCH, DEPARTMENT OF MINES AND NATURAL RESOURCES (Winnipeg)

The Game and Fisheries Branch of the Department of Mines and Natural Resources supports short-term fishery research projects which are conducted by the staff and senior students of the University of Manitoba. Such work includes lake surveys, food of commercial fish, examination of scales to determine the age composition of the commercial catch, etc. It also maintains a hatchery service. The Branch co-operates with the Central Fisheries Research Station of the Fisheries Research Board of Canada.

Publications

(1) Annual Report: Summary of the activities of the Department of Mines and Natural Resources including the report of the Director of the Game and Fisheries Branch.

Senior Officer

Director, Game and Fisheries Branch (1950): G. W. Malaher.

ONTARIO

FISH AND WILDLIFE DIVISION, DEPARTMENT OF LANDS AND FORESTS (Toronto)

The Fish and Wildlife Division of the Department of Lands and Forests carries on considerable biological research. The Division was established in 1946 and is composed of four sections: Enforcement, Wildlife, Game Fish, and Commercial Fish. Before 1946, research was carried on by several government and university groups working more or less independently. With the formation of the Fish and Wildlife Division, an expanded program of work has been established. This program involves stream and lake surveys, population studies, reel census work, fish disease and parasite studies, hatchery research, and other related investigations.

Publications

(1) Biological Bulletin (irregular): Results of investigations.
(2) Sylva (bi-monthly): Published by the Department of Lands and Forests. Contains articles of a popular nature on the natural

resources of Ontario with occasional articles on fishery subjects.

Senior Officer

Chief, Fish and Wildlife Division (1950): W. J. K. Harkness.

QUEBEC

DEPARTMENT OF MARITIME FISHERIES (Département des Pêcheries) (Québec)

The Department of Maritime Fisheries employs several fishery biologists who are engaged in research mainly with shad, salmon, and the channel catfish (Ictalurus lacustris). In 1948, the investigations dealt mainly with marking experiments designed to determine the migrations of the various commercial species and to understand the population dynamics.

Technological research is designed to assist the fishing industry in the technical application of modern methods of freezing, canning, drying, smoking, and the production of fishmeal and oil.

Research on fresh-water fish and fish cultural procedures is undertaken by the Department of Game and Fisheries (Département de la Chasse et des Pêcheries) also with headquarters in Quebec.

Publications

(1) Contribution du Département des Pêcheries (irregular): Annual Report included in this series which contains papers on the results of research.

Senior Officer

Deputy Minister of Maritime Fisheries (1950): Arthur Labrie.

SASKATCHEWAN

FISHERIES BRANCH, DEPARTMENT OF NATURAL RESOURCES AND INDUSTRIAL DEVELOPMENT (Regina)

The Department of Natural Resources and Industrial Development, through its Fisheries Branch with headquarters in Prince Albert, carries on investigations on the various fresh-water fisheries of the province through a co-operative arrangement with the University of Saskatchewan (Saskatoon).

Publications

(1) Annual Report: Published by the Department of Natural Resources and Industrial Development and includes a report on the activities of the Fisheries Branch.

Senior Officer

Supervisor of Fisheries (1950): A. H. MacDonald.

Universities and Colleges

Twelve or more Canadian universities offer courses in the fundamentals of biological sciences which can serve as suitable prerequisites to specialized training in fishery biology. Only the University of British Columbia and the University of Toronto give special attention to this field.

In general, Canadian universities do not offer specialized training in fishery technology. Students entering this field receive training in bacteriology, chemistry, and related subjects which can be obtained from most of the universities in the country. However, Dalhousie University and the University of British Columbia do receive co-operation from the stations of the Fisheries Research Board of Canada which provide facilities for graduate students doing technological research in fisheries. The Fisheries School affiliated with Laval University is the only institution offering a degree in fishery science, but the training is general and perhaps not sufficiently specialized for advanced research.

The institutions mentioned are listed below, with a brief outline of the fisheries training offered.

UNIVERSITY OF BRITISH COLUMBIA (Vancouver, British Columbia)

The University of British Columbia, through the Department of Zoology in the Faculty of Arts and Sciences offers courses in fishery biology which lead to the degrees of bachelor of arts, master of arts, and doctor of philosophy. In this field, particular emphasis is given to problems relating to the biological management of commercially important marine fisheries.

Academic training in oceanography at the graduate level is offered by the Institute of Oceanography, a co-operative effort of three departments in the University, Chemistry, Physics, and Zoology. Courses and research problems are available in one or more of the three branches of oceanography. Besides its educational functions, the Institute carries on fundamental oceanographic research.

Students desiring training in other fields dealing with fisheries are able to obtain instruction by the selection of courses offered in various departments of the University. Food technology courses are offered by the Faculty of Agriculture and the Pacific Fisheries Experimental Station of the Fisheries Research Board of Canada co-operates with the Department of Zoology to give training and facilities for research in the handling, preparation, and preservation of fish. Advanced degrees are offered in this field.

Students studying economics and related subjects in the Department of Commerce, in the Faculty of Arts and Sciences, are permitted to select options. Included among the options is that of fisheries. To fulfill this option, prescribed fisheries courses are taken in the Department of Zoology. Courses given by the Department of Commerce lead to the degree of bachelor of commerce.

No information.

Senior Officers

Head of the Department of Zoology (1950): W. A. Clemens.
Chairman of the Committee on Oceanography (1950): W. A. Clemens.
Head of the Department of Commerce (1950): E. H. Morrow.
Dean of the Faculty of Agriculture (1950): Blythe Eagles.

UNIVERSITY OF TORONTO (Toronto, Ontario)

Training in fishery biology at the University of Toronto is offered at the graduate level, leading to the degrees of master of arts and doctor of philosophy. This branch of zoology is a feature of the Department of Zoology. Much of the training is offered through the Ontario Fisheries Research Laboratory, an organization within the Department of Zoology, which is located at Algonquin Park.

Publications

(1) University of Toronto Biological Series (irregular): Scientific papers.

(2) Miscellaneous papers of the Ontario Fisheries Laboratory (irregular): Report results of investigations.

Senior Officer

Head of the Department of Zoology (1950): J. R. Dymond.

DALHOUSIE UNIVERSITY (Halifax, Nova Scotia)

Several departments of Dalhousie University co-operate to give courses in food technology. This work leads to the degrees of bachelor of arts and master of arts. For the training dealing with the handling, preparation, and preservation of fish, the University receives the co-operation of the Atlantic Fisheries Experimental Station of the Fisheries Research Board of Canada. This station, for the past two years, has been giving a course in bacteriology to Dalhousie students as well as providing facilities for graduate research.

Publications

There are no publications in this field.

Senior Officer

Heads of several departments are concerned with the Food Technology work.

SCHOOL OF FISHERIES OF LAVAL UNIVERSITY (L'Ecole Supérieure des Pêcheries de l'Université Laval) (Ste. Anne de la Pocatière, Quebec)

The School of Fisheries within the Faculty of Agriculture of Laval University, Quebec, offers general training in fisheries. Subjects given include technology, biology, chemistry, oceanography, navigation, economics, etc. The prescribed course extends over four years and students receive the degree of bachelor of science in fisheries. The training offered is suitable for those entering the fishing industry or government administration but is not, perhaps, sufficiently specialized for advanced research.

Publications

No information.

Senior Officer

Director of the School of Fisheries (1950): Louis-Philippe Caron.

Other Institutions

The St. Lawrence Biological Station is the only private Canadian institution actively engaged in fishery research, other than the educational institutions already listed. A description of this station is given below. The National Research Council (Ottawa, Ontario), the British Columbia Research Council (Vancouver, British Columbia), and the Nova Scotia Research Foundation (Halifax, Nova Scotia) have carried on some technological research in fisheries, but this work has been incidental to their main research work in other fields. The first institution is sponsored by the Federal Government, while the latter two are provincial organizations.

ST. LAWRENCE BIOLOGICAL STATION (La Station Biologique du St. Laurent) (Quebec, Quebec)

The St. Lawrence Biological Station is a laboratory of the Laval University. It is financed by the University and the Province of Quebec. The staff consists of a director and several biologists. In 1947, there were six biologists and eleven seasonal employees, the latter being university students.

The biological fishery investigations conducted by the Station, in many respects, supplement the research of the Quebec Department of Fisheries. The 1947 Annual Report gives an outline of the type of investigations undertaken. During 1947, the staff conducted studies of the age classes and food of the cod, systematic studies on the lobster, lobster culture work, investigation into the fresh-water life history of the smelt, biology of the clam and the oyster, and abundance of marine copepods in relation to the characteristics of the waters.

Publications

(1) Annual Report: Summary of activities appearing in Contribution du Département des Pêcheries (Québec)

(2) Miscellaneous papers (irregular): Results of scientific investigations.

Senior Officer

Director (1950): J. L. Tremblay.

CUBA

Government Agencies

The principal government agency concerned with fisheries in Cuba is the Division of Fisheries of the Bureau of Forests, Mines and Waters, under the Ministry of Agriculture. Government sponsored fishery research is carried on by this agency, but the Cuban Navy also does some oceanographic work. The Division of Fisheries and the Navy are believed to co-operate in the oceanographic investigations.

Early fishery work in Cuba was carried on by the Ciénaga Fish Culture Station (Estación Piscícola de la Ciénaga), established in 1927 and the National Institute of Scientific Investigations and the Museum of Natural History (Instituto Nacional de Investigaciónes Científicas y Museo de Historia Natural) one year later. The fish culture station, which was operated by the Ministry of Agriculture until discontinued a few years ago, was engaged in the stocking of the rivers and streams with suitable fresh-water species. The Institute operated for three years and carried on faunal and systematic studies.

DIVISION OF FISHERIES, BUREAU OF FORESTS, MINES AND WATERS, MINISTRY OF AGRICULTURE (Negociado de Pesca, Dirección de Montes, Minas y Aguas, Ministerio de Agricultura) (Havana)

In recent years, the Division of Fisheries of the Bureau of Forests, Mines and Waters under the Ministry of Agriculture has not been actively engaged in fishery research, technological, or biological. However, recent reports indicate that the agency plans to re-initiate fishery investigations.

Publications

(1) Revista del Ministerio de Agricultura (semi-annual): Account of the activities of the Ministry of Agriculture and informative articles on agricultural subjects, occasionally those on fisheries.

(2) Miscellaneous publications (irregular): Separates occasionally published by the Ministry of Agriculture or the Division of Fisheries on various subjects, laws, etc.

Senior Officer

Chief, Division of Fisheries (1949): Arturo A. Ojeda

Universities and Other Institutions

Specialized training for fishery research workers is not available in Cuba, but fundamental courses in the biological sciences are given at the University of Havana. The Poey Museum attached to the Faculty of Sciences of the University appears to be the only private institution engaged in fishery research.

POEY MUSEUM, UNIVERSITY OF HAVANA (Museo Poey, Universidad de la Habana) (Havana)

The Poey Museum of the University of Havana carries on studies in the natural sciences, including systematic ichthyology and oceanography. In addition to its own publications, the museum publishes the scientific journal of the "Carlos de la Torre" Malacological Society (La Sociedad Malacológica "Carlos de la Torre").

Publications

(1) Memorias de la Sociedad Cubana de Historia Natural "Felipe Poey" (irregular): Official organ of the Poey Museum with contributions in the field of natural sciences by Cubans and foreign scholars. Articles appear in the original language.

(2) Torreia (irregular): Articles in Spanish and English on the natural sciences by Cuban and foreign scientists. One study per issue.

(3) Revista de la Sociedad Malacológica "Carlos de la Torre" (semiannual): Scientific articles on mollusks in the original language, by Cubans and foreign scientists.

Senior Officer

Director, Poey Museum (1950): Not known

MEXICO

Federal Government Agencies

The Mexican Government's fishery research program is carried on by the Bureau of Fisheries and Allied Industries. This bureau is a division of the Ministry of the Navy and has complete jurisdiction over the fisheries resources of the country.

The Government first became interested in fishery research through the work of the Bureau of Biological Studies established in 1916 under the Department of Development, Colonization and Industry. This bureau did some faunal work and was largely responsible for establishing the first marine biological station in Mexico which operated at Veracruz for one year in the late 1920's. However, since then the government has done no marine research, but has given attention to fresh-water work.

In 1939, a limnological station was established at Pátzcuaro and it accomplished a considerable amount of fundamental research until activities were discontinued recently. Four years before this, the federal fishery agency established two fish hatcheries and began stocking streams and lakes of the plateau areas, and it is fish culture work which presently occupies most of the attention of the Bureau of Fisheries.

BUREAU OF FISHERIES AND ALLIED INDUSTRIES, MINISTRY OF THE NAVY (Dirección General de Pesca a Industrias Conexas, Secretaría de la Marina Nacional (Mexico, D.F.)

The fishery research program of the Bureau of Fisheries and Allied Industries of the Ministry of the Navy is carried on by two of the Bureau's seven offices or branches. These branches are the Marine Technical Office and the Interior Technical Office. The former is concerned with the marine resources while the latter deals with the inland fisheries.

The Marine Technical Office is not actively engaged in research although it does carry on some oyster culture work. It is presently more concerned with the operation of two practical fishing schools where fishermen are trained in navigation and fishing methods. The Interior Technical Office operates several fish hatcheries for the stocking of interior waters. Fish being propagated include rainbow and brook trout, large-mouth bass, mojarra (two species of cichlids), and several fresh-water catfish species. Since 1940, the Bureau has encouraged pondfish farming in rural areas by distributing fish fry to farmers. A modern hatchery was constructed at El Zarco in 1941 for this work.

Publications

(1) Revista General de Marina (bimonthly): A review of marine activities.
(2) Memoria de la Secretaría de Marina (annual): A review giving production statistics, etc.
(3) Miscellaneous publications.

Senior Officer

Director General of Fisheries (1950): Modesto Saenz Juarez

Universities and Colleges

Several universities and colleges in Mexico offer fundamental courses in the biological sciences, but none offer specialized training for fishery research workers, either biological or technological. However, basic training in biology as a prerequisite to specialized work in fishery biology is available at the following institutions:

Institute of Biology, National University of Mexico (Instituto de Biología, Universidad Nacional de México), Mexico, D.F.

National School of Biological Sciences, National Polytechnic Institute (Escuela Nacional de Ciencias, Instituto Politécnico Nacional), Mexico, D.F.

Other Institutions

There are two institutions, sponsored by government agencies and the fishing industry which are concerned with biological fishery research, the National Institute of Hydrobiology and the Pacific Institute of Fisheries.

NATIONAL INSTITUTE OF HYDROBIOLOGY (Institutio Nacional de Hidrobiología) (Mexico, D.F.)

The National Institute of Hydrobiology, formed in 1949, consists of representatives from several federal government agencies, fisheries, natural resources, education, as well as from the Bank of Mexico and private industry. It is expected to promote biological research with respect to fisheries.

Publications

None to date.

Senior Officer

Director (1950): Not appointed to date.

PACIFIC INSTITUTE OF FISHERIES (Instituto de Pesca del Pacífico) (Guaymas, Sonora)

The Pacific Institute of Fisheries was established in 1947 by the Mexican fishing industry with government financial support. The Institute is investigating the species of commercially important fish caught in the Gulf of California, principally shrimp.

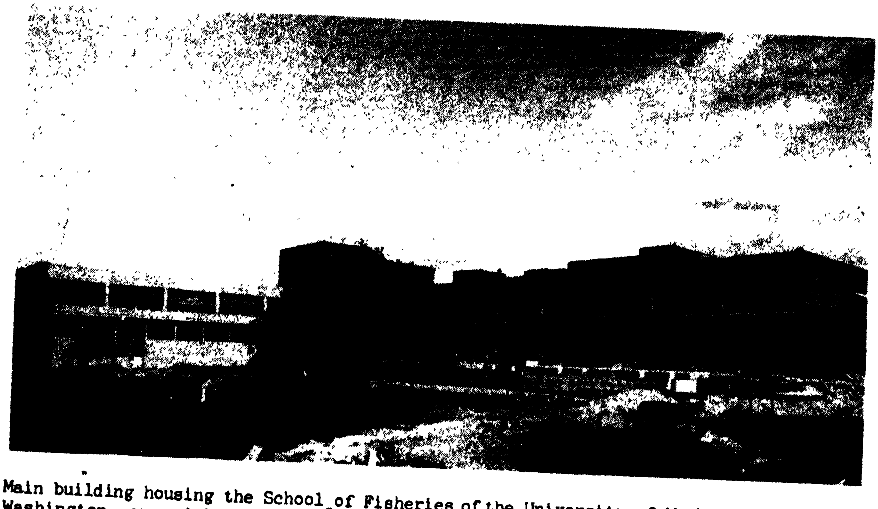
Publications

(1) Reporte Biológico (Vol. 1, No. 1 appeared late in 1949 and reported activities from founding to March 1949).

Senior Officer

Director (1950): René Núnez

Two fishery research vessels operated by the Pacific Oceanic Fishery Investigations of the United States Fish and Wildlife Service, Honolulu, Territory of Hawaii. From left to right. "Hugh M. Smith" - oceanographical and biological research vessel, and "John R. Manning" - exploratory and experimental fishing vessel.



Main building housing the School of Fisheries of the University of Washington, Seattle, Washington, opened in September 1950. Photograph taken prior to the completion of construction. This building also houses the laboratories of the International Fisheries Commission, Washington State Department of Fisheries and the Applied Fisheries Laboratory of the University of Washington.

UNITED STATES OF AMERICA

Federal Government Agencies

The fishery research program of the Government of the United States of America is carried on by the Fish and Wildlife Service of the Department of the Interior which is also engaged in game or wildlife research. It also administers the fisheries and game resources under federal jurisdiction.

The United States Government became engaged in the field of fishery research in 1871 with the establishment of the Commission of Fish and Fisheries, which was instructed to determine whether the marine and fresh-water stocks of food fish were being depleted and to see if regulatory measures were necessary. The center for these investigations was in the area of Woods Hole, Massachusetts, where the Fish Commission established a small laboratory in 1875.

The Commission was the forerunner to the Bureau of Fisheries established in the Department of Commerce and Labor in 1903 and the Fish and Wildlife Service was created in 1940 to supplant the latter and the Bureau of Biological Survey which was responsible for game or wildlife work.

FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR

(Washington 25, D.C.)

The fishery research program of the Fish and Wildlife Service is carried out by two of eight divisions and offices under a director responsible to the Secretary of Interior. The headquarters office is in Washington, D.C. and there are six regional offices and numerous laboratories and field stations throughout the country and in the territories.

Biological research is undertaken by the Branch of Fishery Biology of the Division of Research. Its program is designed to discover the nature, extent, and causes of variations in abundance of the important food fish and other aquatic animals; to reveal depletion; to recommend measures for conserving, developing, and managing the fisheries resources, including improvements in fish cultural practices, combating fish diseases, and stocking and managing fish supplies in the interior waters; to improve the cultivation of aquatic animals, including shellfish, and to recommend conservation measures. It operates six or more fishery research vessels for biological investigations.

Research on the biology of marine mammals, particularly the fur seal herds of the Pribilof Islands, is the responsibility of the Branch of Wildlife Research, also of the Division of Research. The design of fishways and other protective devices is undertaken by the Branch of Engineering of the Division of Management.

Technological and economic research, and exploratory fishing and gear development come under the Branch of Commercial Fisheries of the Division of Commercial Fisheries. This branch carries on technological investigations to improve methods of catching, handling, preserving, storing and transporting fishery products and by-products, and conducts exploratory fishing and gear development projects in the fisheries of the United States and its territories and island possessions. The Branch operates two fishing vessels for exploratory work. The Branch of Commercial Fisheries also carries on economic research on costs, employment, labor, and prices; collects, analyzes, and disseminates statistics of the fisheries industries; and operates market news, educational, and market development services.

The principal biological investigations of the Branch of Fishery Biology, their headquarters and number of scientific personnel engaged are as follows:

1. Alaska Fishery Investigations (2725 Montlake Boulevard, Seattle, Washington)
   Scientific personnel (1950): 11 full-time, 20 seasonal
   Investigations concerned with: principal commercial species in Alaska waters with emphasis on 2 of the 5 species of Pacific salmon (pink and sockeye or red salmon), and herring.

2. North Pacific Fishery Investigations (2725 Montlake Boulevard, Seattle, Washington)
   Scientific personnel (1950): 11 full-time
   Investigations concerned with: maintenance of salmon and anadromous trout populations of the Columbia River watershed, particularly with reference to numerous water-use projects such as dams, irrigation, etc.

3. South Pacific Fishery Investigations (Stanford University, Stanford, California)
Scientific personnel (1950): 11 full-time
Investigations concerned with: California sardine investigation in co-operation with the California Bureau of Marine Fisheries, Scripps Institution of Oceanography, and the California Academy of Sciences.

4. Pacific Oceanic Fishery Investigations (Honolulu, Territory of Hawaii)
Scientific personnel (1950): 12 full-time
Investigations concerned with: biological and oceanographic research dealing with the study of the tuna populations of the tropical and subtropical waters of the Pacific territories and possessions; exploratory and experimental fishing for tuna and tuna bait fish.

5. Gulf of Mexico Fishery Investigation (Galveston, Texas)
Scientific personnel (1950): 6 full-time
Investigations concerned with: biological and oceanographic studies of the Gulf of Mexico in co-operation with the Texas A and M Research Foundation and State agencies concerned principally with menhaden, tuna, shrimp, and the red tide organism.

6. Gulf Oyster Investigations (Pensacola, Florida)
Scientific personnel (1950): 1 full-time, 3 seasonal
Investigations concerned with: biology of the oyster and oyster culture practices.

7. Middle and South Atlantic Fishery Investigations (Beaufort, North Carolina)
Scientific personnel (1950): 10 full-time
Investigations concerned with: primarily the rehabilitation of the Atlantic Coast shad fishery.

8. North Atlantic Fishery Investigations (Woods Hole, Massachusetts)
Scientific personnel (1950): 11 full-time
Investigations concerned with: groundfish of North Atlantic fishing banks, (principally haddock and rosefish).

9. Atlanctic Salmon Investigations (Orono, Maine)
Scientific personnel (1950): 2 full-time
Investigations concerned with: rehabilitation of the Atlantic salmon populations of the New England States.

10. Great Lakes Fishery Investigation (University of Michigan, Ann Arbor, Michigan)
Scientific personnel (1950): 16 full-time
Investigations concerned with: control of predatory sea lamprey, life history studies of commercial species of the Great Lakes, effect of artificial propagation on abundance of lake trout.

11. Eastern Fish-Cultural Investigations (Leetown, West Virginia)
Scientific personnel (1950): 2 full-time
Investigations concerned with: inland fisheries to the east of the Continental Divide - fundamental research dealing with pond productivity and fish cultural practices.

12. Microbiological Laboratory (Leetown, West Virginia)
Scientific personnel (1950): 2 full-time
Investigations concerned with: isolation of pathogenic organisms and diagnosis and treatment of diseases of fish hatcheries.

13. Central Valley Fishery Investigations (Stanford University, Stanford, California)
Scientific personnel (1950): 5 full-time
Investigations concerned with: maintenance of populations of anadromous species and fresh-water species with reference to numerous water-use projects, particularly in the Central Valley of California.

14. California Trout Investigations (Reno, Nevada)
Scientific personnel (1950): 3 full-time
Investigations concerned with: production of trout in high altitude lakes and streams.

15. Western Fish-Cultural Investigations (2725 Montlake Boulevard, Seattle, Washington)
Scientific personnel (1950): 6 full-time
Investigations concerned with: fish culture, including pathology, feeding, hatchery practices, and transplanting of salmon.

16. Fish Nutrition Investigations (Cortland, New York)
Scientific personnel (1950): 1 full-time
Investigations concerned with: basic nutrition requirements of cold-water fish, principally trout, for the development of adequate hatchery diets.

17. Clam Investigations (Boothbay Harbor, Maine)
Scientific personnel (1950): 8 full-time, 6 seasonal

Investigations concerned with: physiology, natural and artificial propagation, growth, predation, and pathology of clams of the Atlantic Coast.

18. Milford Shellfish Laboratory (Milford, Connecticut)
Scientific personnel (1950): 4 full-time
Investigations concerned with: natural and artificial propagation of the oyster and clam, and studies of their predators.

19. Woods Hole Shellfish Laboratory (Woods Hole, Massachusetts)
Scientific personnel (1950): 1 full-time
Investigations concerned with: oyster culture.

20. Chesapeake Bay Shellfish Investigations (Annapolis, Maryland)
Scientific personnel (1950): 3 full-time, 4 seasonal
Investigations concerned with: physiology, natural and artificial propagation, growth, predation, and pathology of the oyster of the Chesapeake Bay region.

The research programs of the Branch of Commercial Fisheries which deal with improving methods of handling, preservation, utilization and marketing of fishery products, and by-products, and exploratory fishing and gear development are carried out at the following laboratories and field stations:

Technological Laboratories

1. Fishery Technological Laboratory (2725 Montlake Boulevard, Seattle, Washington)
Scientific personnel (1950): 5 full-time

2. Fishery Technological Laboratory (Ketchikan, Alaska)
Scientific personnel (1950): 3 full-time

3. Fishery Technological Laboratory (College Park, Maryland)
Scientific personnel (1950): 6 full-time

4. Fishery Technological Laboratory (61 Sumner St., Lockwood Basin, East Boston, Massachusetts)
Scientific personnel (1950): 3 full-time

Exploratory Fishing and Gear Development Field Stations

1. Exploratory Fishing Field Station (2725 Montlake Boulevard, Seattle, Washington)
Fishery engineers (1950): 4 full-time

2. Exploratory Fishing Field Station (City Dock, Pascagoula, Mississippi)
   Fishery engineers (1950): 3 full-time

3. Gear Development Station (College Park, Maryland)
   Fishery engineers (1950): 1 full-time

4. Experimental Fishery Field Station (College Park, Maryland)
   Fishery engineers (1950): 1 full-time

Publications

(1) Annual Report: Records the year's fisheries projects as carried out by the various offices of the Service.

(2) Conservation Bulletins (irregular): A popular series of an informational or advisory nature, adapted to the interest of the people of the different sections of the country. Published by the Department of Interior with contributions from its various agencies.

(3) Conservation in Action (irregular): An educational illustrated series treating the history of the conservation of natural resources in broad outline.

(4) Fishery Leaflets (irregular): Short papers on domestic and foreign fisheries from many varied aspects. (FL No. 9, Revised December 1949, contains a subject index to the Leaflets.)

(5) Fishery Bulletins (irregular): Scientific papers of varied length, on studies related to fish or fishery problems.

(6) Special Scientific Report - Fisheries (irregular): Results of investigations, usually of restricted scope or temporary nature, intended to aid or direct management or utilization practices and as guides for administrative or legislative action.

(7) Research Reports (irregular): Short papers on such topics as: fish handling, canning methods, reactions to environment, fluctuations in species, etc.

(8) Circulars (irregular): Short papers on such topics as: propagation of bait species, insecticides, etc.

(9) Progressive Fish Culturist (quarterly): News and views from many sources on practical fish hatchery problems.

(10) Commercial Fisheries Review (monthly): A review of domestic and foreign developments and news of the fishery industries.

(11) Commercial Fisheries Abstracts (monthly): Abstracts of articles deemed of interest to the commercial fishing industry and to fishery technological laboratories.

(12) Statistical Digests (annual): Two digests are printed annually:- (1) Alaska fishery and fur-seal industries; and (2) fishery statistics of the United States.

(13) Current Fisheries Statistics: Miscellaneous fishery statistics, by regions, by products, etc., published monthly, annually, or both.
(14) Regulatory Announcements (irregular): Regulations for all wildlife protection in the United States and its possessions.
(15) Fishery Products Reports (daily): Information on prices, supplies and receipts, imports, cold storage holdings, market reports for seven sections of the United States. Issued at Boston, Mass., New York, N.Y., Hampton, Va., Chicago, Ill., Seattle, Wash., San Pedro, Calif., and New Orleans, La.

Senior Officer

Director, Fish and Wildlife Service (1950): Albert M. Day

State, Territorial, and Insular Government Agencies

Each of the forty-eight state governments in the United States of America have official agencies dealing with fisheries. However, not all these agencies carry on fishery research. The agencies listed below are those engaged in, or sponsoring, research on the marine and fresh-water fisheries of commercial importance. This includes agencies in the coastal states and those bordering the Great Lakes.

ALABAMA

DIVISION OF GAME, FISH AND SEAFOODS, DEPARTMENT OF CONSERVATION (Montgomery)

Although the Division of Game, Fish and Seafoods of the Department of Conservation does not carry on fishery research, it finances biological investigations which are carried out by the Alabama Agricultural Experiment Station of the Alabama Polytechnic Institute, Auburn. Most of the research deals with pondfish culture practices, although some survey work has been done on the marine resources.

Publications

(1) Annual Report: Summary of the activities of the four divisions of the Department of Conservation.
(2) Alabama Conservation (monthly): Contains conservation news. and notes on the activities of the Department.

Senior Officer

Chief, Division of Game, Fish and Seafoods (1950): C. G. Hixon

CALIFORNIA

DIVISION OF FISH AND GAME, DEPARTMENT OF NATURAL RESOURCES (Ferry Building, San Francisco)

The Division of Fish and Game of the Department of Natural Resources carries on biological research through two of its six bureaus, the Bureau of Marine Fisheries and the Bureau of Fish Conservation. The former is concerned with the marine fisheries, and the latter with the fresh-water sport or game fish.

The most important investigations being conducted by the Bureau of Marine Fisheries are those dealing with the sardine, salmon, trawlfish (groundfish), tuna, and mackerel fisheries. Other fisheries receiving attention are those for crustaceans, mollusks, herring, and anchovy. At present, highest priority is given to the sardine investigation being carried on in co-operation with Scripps Institution of Oceanography, the U.S. Fish and Wildlife Service, and the California Academy of Sciences and co-ordinated by the Marine Research Committee. The Bureau is concentrating on obtaining information on the availability, abundance, distribution, and migrations of the sardine.

The main center for the scientific staff is the California State Fisheries Laboratory, operated by the Bureau of Marine Fisheries and located at Terminal Island Station, San Pedro. This laboratory is headquarters for the state sardine, tuna, and mackerel investigations.

The Bureau of Fish Conservation is charged with making investigations and performing activities which will further the conservation and propagation of fresh-water fish. The research staff conducts surveys of streams and lakes, supervises the planting of fish and rescuing of fish from irrigation diversions, etc., compiles creel counts from catch records secured from sportsmen, studies the effects of dams on anadromous fish, and runs fish farm projects, etc.

Publications

(1) Biennial Report of the Division of Fish and Game: Summarizes the division's work.

(2) Fish and Game (quarterly): A magazine devoted to semipopular articles on both wildlife and fish.

(3) Fish Bulletin (irregular): Published work of the Bureau of Marine Fisheries and covers the biological research, statistics of catch, and other data of interest to fishermen and industry.

(4) Statistical Report of Fresh and Canned Fishery Products (annual): Contains statistics of production of the commercial fisheries.

Senior Officer

Executive Officer, Division of Fish and Game (1950): E.L. MacCaulay

FLORIDA

FLORIDA STATE BOARD OF CONSERVATION (Tallahassee)

The Florida State Board of Conservation responsible for the administration of marine fisheries has no research staff but subscribes to the annual budget of the University of Miami Marine Laboratory see also page 54) which carries on a biological research program for the Board. Main features of the research are:

1. Crawfish research: life history studies, growth rates, natural and fishing mortalities, determination of proper size limits for the fishery;
2. Mullet research: life history and population dynamic studies to determine the cause of decline of the fishery and to offer recommendations for its management;
3. Red tide investigation: work on the determination of the factors responsible for the red tide organism (Gymnodinium brevis);
4. Sponge research: surveys of the sponge beds to determine procedures for rehabilitation and possibilities of sponge culture;
5. Oyster research: evaluating condition and growth of the oyster, studies on experimental farms.

Research on the fresh-water game fish resources is undertaken by the Florida Game and Freshwater Fish Commission, also with headquarters in Tallahassee.

Publications

(1) Biennial Report: Summarizes the work of the Board of Conservation and the research work undertaken for the Board by the Marine Laboratory of the University of Miami.

(2) Educational Series (irregular): Gives aspects of the investigations of the Marine Laboratory and other practical information of particular interest to the fishing industry. Prepared by the staff of the Marine Laboratory.
(3) Technical Series (irregular): Results of research investigations undertaken by the staff of the Marine Laboratory.
(4) Mimeographed Reports (irregular): Scientific reports comparable to the Technical Series.

Senior Officer
Supervisor of Conservation (1950): George Vathis

ILLINOIS

ILLINOIS NATURAL HISTORY SURVEY, DEPARTMENT OF REGISTRATION AND EDUCATION (Natural Resources Building, Urbana)

The Illinois Natural History Survey of the Department of Registration and Education carries on biological research in fisheries. Results of the research are applied by the Division of Fisheries of the Department of Conservation (Springfield) in the regulation and administration of the fisheries,

The fishery investigations are carried on by the Section of Aquatic Biology, one of seven sections in the Natural History Survey, and are confined mainly to the game fish populations and little attention is paid to the commercial fisheries of Lake Michigan and the bottomland lakes bordering the Illinois and Mississippi rivers. Special emphasis is given to the management problems of small artificial lakes.

Publications
(1) Bulletin (irregular): Presents results of scientific investigations.
(2) Circulars (irregular).
(3) Biological Notes (irregular).

Senior Officer
Chief, Illinois Natural History Survey (1950): H. B. Mills

INDIANA

DIVISION OF FISH AND GAME, DEPARTMENT OF CONSERVATION (311 West Washington St., Indianapolis)

The Division of Fish and Game of the Department of Conservation carries on biological research. This work is undertaken by the Fisheries Section in co-operation with the University of Indiana who jointly sponsor the fishery investigations of the Indiana Lake and Stream Survey. The investigations which have been reported on deal with faunal and distribution studies, creel census work, growth rate studies, data on feeding habits, quantitative population studies related to the measurement of fishing and natural mortalities, and problems of pollution and deal mainly with game fish.

Publications

(1) Yearbook (annual): Summarizes the work of each of the divisions of the Department of Conservation. Reports of the divisions are also reprinted separately.
(2) Outdoor Indiana (monthly): Contains news and articles of interest principally to sportmen.
(3) Investigations of Indiana Lakes and Streams (irregular): Contain papers dealing with biological investigations.

Senior Officer

Director, Division of Fish and Game (1950): H. P. Cottingham

LOUISIANA

DEPARTMENT OF WILD LIFE AND FISHERIES (Civil Courts Building, New Orleans)

The biological research program of the Department of Wild Life and Fisheries is carried on by the Research and Statistics Division. Included in the program is work on the eradication of water hyacinth in the inland waters, study of oyster mortalities caused by pollution and floods, development of improved oyster culture practices, development of new oyster beds, and planting of both oyster shells and seed oysters.

Publications

(1) Biennial Report: Summarizes the work of the Department of Wild Life and Fisheries.
(2) Bulletins (irregular): Investigational reports.

Senior Officer

Commissioner of Wild Life and Fisheries (1950): E.S. Clements

MAINE

DEPARTMENT OF SEA AND SHORE FISHERIES (State House, Augusta)

The biological research work of the Department of Sea and Shore Fisheries is undertaken by the Division of Conservation and Propagation. Special attention is given to lobster, scallops, smelt, and restoration of salmon. Some research is also being done on the bluefin tuna, sea moss, clam, cormorant, and gull control, shad restoration, oyster, crab, and pollution problems. Research problems related to the fresh-water game fish resources are the responsibility of the Department of Inland Fisheries and Game, also located at Augusta.

Publications
(1) Biennial Report: Summary of the activities of the Department of Sea and Shore Fisheries.
(2) Fisheries Circulars (irregular): Results of scientific investigations.

Senior Officer
Commissioner (1950): R. E. Reed

ATLANTIC SEA-RUN SALMON COMMISSION (State House, Augusta)

The Atlantic Sea-Run Salmon Commission, composed of three commissioners appointed by the Governor of Maine, co-ordinates the work of the Department of Sea and Shore Fisheries, the Department of Inland Fisheries and Game and the U.S. Fish and Wildlife Service concerned with restoration of the Atlanctic salmon runs in Maine.

Publications
(1) Research Reports (irregular): Results of investigations of cooperating agencies.

Senior Officer
Chairman (1950): R. E. Reed

MARYLAND

DEPARTMENT OF RESEARCH AND EDUCATION, BOARD OF NATURAL RESOURCES (Annapolis)

Fishery research in the State of Maryland is the responsibility of the

Department of Research and Education, one of five departments under the Board of Natural Resources. For this work the Department operates the Chesapeake Biological Laboratory at Solomon's Island.

Main emphasis of the research is commercial fishery investigations, particularly work on the oyster with respect to relationship between replacement by natural reproduction and harvesting. Other species being studied are crab, shad, and croaker.

Publications

(1) Annual Report: Summarized the activities of each of the departments of the Board of Natural Resources.
(2) Publications (irregular series): Are the scientific reports of the Department of Research and Education.
(3) Educational Series (irregular): Educational and economic reports.

Senior Officer

Director, Department of Research and Education (1950): R.V. Truitt

MASSACHUSETTS

DEPARTMENT OF CONSERVATION (15 Ashburton Place, Boston)

The Department of Conservation, through the two divisions responsible for fisheries, the Division of Marine Fisheries and the Division of Fisheries and Game, carries on a limited amount of biological research. Commercial fishery research deals principally with oyster and lobster culture.

Publications

(1) Annual Report: Summary of activities

Senior Officer

Commissioner of Conservation (1950): A. T. Lyman

MICHIGAN

FISH AND FISHERIES DIVISION, DEPARTMENT OF CONSERVATION (Lansing)

The biological research work of the Fish and Fisheries Division of the Department of Conservation is conducted by the Institute for Fisheries Research which is the technical branch of the Division. The Institute is located on the campus of the University of Michigan, at Ann Arbor.

The investigations of the Institute are mainly devoted to game fish, with some work done on the commercial fisheries of the Great Lakes. The specific problems undertaken by the Institute include: further research into methods and value of stream and lake improvement; development of management methods; studies of migration, growth rates, food habits, spawning habits, predators, and creel census work. Research in fish nutrition and fish diseases are also being conducted. Co-operative work is being carried on with the U.S. Fish and Wildlife Service, in connection with the predation by the sea lamprey on the commercial fish populations.

The Institute also co-operates with the Department of Fisheries of the School of Natural Resources at the University of Michigan by giving financial assistance to students who work on problems of practical interest to the Institute. Co-operative agreements also exist with Michigan State College.

Publications

(1) Biennial Report: Summarizes the work of the Department of Conservation.
(2) Michigan Conservation (monthly): Magazine containing conservation news.
(3) Publications of the Institute of Fisheries Research (irregular): Results of scientific investigations, appearing in the Bulletin Miscellaneous Reports, and Mimeographed Reports.
(4) Miscellaneous publications (irregular).

Senior Officer

Chief, Fish and Fisheries Division (1950): F. A. Westerman

MINNESOTA

DIVISION OF GAME AND FISH, DEPARTMENT OF CONSERVATION

(State Office Building, St. Paul)

The Fishery research program of the Division of Game and Fish of the Department of Conservation is undertaken by the Bureau of Fisheries. The research is biological and deals with both the commercial and game fish resources. The general projects include: lake and stream surveys, experimental management studies, life history, and racial studies of the Great Lakes herring, studies of fish parasites, and control of the growth of algae.

Publications

(1) Biennial Report: Summarizes the work of the various divisions of the Department of Conservation (Publication of the Department of Conservation).

(2) Conservation Volunteer (monthly): Contains news and articles on conservation of a popular nature (Publication of the Department of Conservation).

(3) Conservation Bulletin (irregular): Semi-technical articles of an educational nature (Publication of the Department of Conservation).

(4) Technical Bulletin (irregular): Investigational reports of the Division of Game and Fish.

(5) Miscellaneous Reports (irregular): Published by the Department of Conservation and also by the Division of Game and Fish, technical and educational.

Senior Officer

Director, Division of Fish and Game (1950): F. D. Blair

NEW HAMPSHIRE

DEPARTMENT OF FISH AND GAME (State House Annex, Concord)

The Department of Fish and Game employs two biologists in the Fish Research Division and their research is centered on fresh-water and anadromous fish. The most recent biennial report does not indicate the nature of the present investigations.

Publications

(1) Biennial Report: Summary of the activities of the Department of Fish and Game.

(2) Miscellaneous Reports (irregular): Investigational and technical reports.

Senior Officer

Director (1950): R. G. Carpenter

NEW JERSEY

DIVISION OF FISH AND GAME AND DIVISION OF SHELL FISHERIES, DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT (State House Annex, Trenton)

Two divisions of the Department of Conservation and Economic Development are responsible for fisheries research in New Jersey. The Division of Fish and Game recently employed two or more biologists for marine and fresh-water research while the Division of Shell Fisheries (formerly the Board of Shell Fisheries) does research on mollusks and crustaceans. The latter investigations have been on the oyster and in the past were carried on for the Division by staff members of Rutgers University, New Brunswick.

Publications

(1) Annual Reports: Separate reports summarizing the activities of the two divisions.

Senior Officers

Director, Division of Fish and Game (1950): A. H. Underhill
Director, Division of Shell Fisheries (1950): G. Hickman

NEW YORK

DIVISION OF FISH AND GAME, CONSERVATION DEPARTMENT (Albany)

Main emphasis of the biological research work of the Division of Fish and Game of the Conservation Department is on problems associated with the fresh-water game fish populations and it is undertaken by the Bureau of Fish and Wildlife. The Bureau of Marine Fisheries cooperates with the U.S. Fish and Wildlife Service in the shad investigations and also works on clam and oyster culture problems.

Publications

(1) Annual Report: Summarizes the work of the Conservation Department.

(2) Bulletins (irregular): Contain technical papers on the work of the Conservation Department. Fisheries papers deal with fish culture problems.

(3) The New York State Conservationist (monthly): A Department of Conservation magazine devoted to conservation news.

Senior Officer

Director, Division of Fish and Game (1950): J. T. Mahoney

NORTH CAROLINA

DIVISION OF COMMERCIAL FISHERIES, BOARD OF CONSERVATION AND DEVELOPMENT (Raleigh)

Biological and technological research is conducted for the Division of Commercial Fisheries of the Board of Conservation and Development by the Institute of Fisheries Research of the University of North Carolina located at Morehead City, North Carolina (see page 54). The Institute is engaged in several investigations. The more important of these are:

1. Shrimp investigation - distribution and life history;
2. Mollusk investigation - oyster spawning, oyster setting and growth rates, oyster planting, abundance of various species of mollusks;
3. Fish investigations - program is being organized to study causes of smaller commercial catches;
4. Oceanographic investigation;
5. Technological research - net deterioration, experimental gear studies.

Publications

No information

Senior Officer

Commissioner, Division of Commercial Fisheries (1950): C.D. Kirkpatrick (acting)

OHIO

DIVISION OF WILDLIFE, DEPARTMENT OF NATURAL RESOURCES (State Office Building, Columbus)

The Division of Wildlife of the Department of Natural Resources carries on practical biological research concerned with field production, but problems of academic nature requiring elaborate laboratory equipment and prolonged study are allotted to several Ohio colleges and universities. The chief one among the latter is the Franz Theodore Stone Laboratory of Ohio State University, located at Put in Bay.

Publications

(1) Annual Report of the Division of Wildlife: Summarizes the work of the Division.
(2) Ohio Conservation (monthly): Contains conservation news and articles about the Division of Wildlife (Published by the Department of Natural Resources)
(3) Wildlife Conservation Bulletin (irregular): Contains scientific papers.
(4) Miscellaneous reports and pamphlets (irregular): Contain articles of both a popular and scientific nature.

Senior Officer

Chief, Division of Wildlife (1950): L. S. Roach

OREGON

FISH COMMISSION OF THE STATE OF OREGON (Governor Building, Portland)

The Division of Research of the Fish Commission of the State of Oregon is responsible for biological studies to determine the causes of the decline of the various commercial fish populations and to develop methods for the conservation and rehabilitation of the different species. Special attention is being given to the several species of Pacific salmon, which migrate into the Columbia River system and the many coastal streams in order to determine times and rates of migration, spawning conditions, escapement throught the commercial fishery, etc. Co-operative studies are undertaken with Washington age, and abundance. Studies are also being made to measure the effects of different fishing gears on the fish populations. Investigations dealing with mollusks and crustaceans are also carried on.

Publications

(1) Biennial Report: Summarizes the work of the Fish Commission.
(2) Research Briefs (irregular): Short reports to inform the public and fishing industry of the current research programs.
(3) Contributions (irregular): Scientific reports on completed investigations.

Senior Officer

Master Fish Warden (1950): A. J. Suomela

PENNSYLVANIA

BOARD OF FISH COMMISSIONERS (Harrisburg)

Biological research undertaken by the Board of Fish Commissioners is carried on at the Board's Fisheries Laboratory located at Bellefont. The program is primarily concerned with game fish populations. Included are investigations of the various inland waters as to suitability for stocking with fish, control of fish diseases, feeding habits of fish, and pollution from industrial wastes.

Publications

(1) Biennial Report: Summarizes the work of the Board of Fish Commissioners.
(2) Pennsylvania Angler (monthly): Contains articles on fishing from the sportsman's point of view.

Senior Officer

Executive Director (1950): C. A. French

RHODE ISLAND

DIVISION OF FISH AND GAME, DEPARTMENT OF AGRICULTURE AND CONSERVATION (State House, Providence)

Although the Division of Fish and Game of the Department of Agriculture and Conservation does not carry on fishery research, it sponsors, together with the Rhode Island State College, the Narragansett Marine Laboratory at Kingston, for biological research. The laboratory is doing research on mollusks and crustaceans.

Publications

(1) Annual Report: Summary of the work of the Division of Fish and Game.

Senior Officer

Administrator, Division of Fish and Game (1950): E. C. Hayes

TEXAS

GAME, FISH AND OYSTER COMMISSION (Austin)

The Game, Fish and Oyster Commission operates a marine laboratory at Rockport, which conducts biological research on the marine fisheries. Present work deals with life history and growth studies on the blue crab, marine borer, and other fouling organisms, effect of silting from dredging on oyster beds, menhaden investigations to determine the effect of the menhaden fishery on the food and game fish populations, investigations of the spawning behavior of shrimp, studies of oyster parasites, and experiments in oyster culture. The Commission also does research on the inland game fish resources.

Publications

(1) Annual Report: Summarizes the work of the Game, Fish and Oyster Commission.
(2) Texas Fish and Game (monthly): Conservation news and articles of interest chiefly to sportsmen.
(3) Annual Report of the Marine Laboratory: Summarizes the work of the Marine Laboratory and contains scientific reports.
(4) Bulletin (irregular): Investigational reports.

Senior Officer

Executive Secretary (1950): H. D. Dodgen

VIRGINIA

COMMISSION OF FISHERIES (Newport News)

Biological research for the Commission of Fisheries is undertaken by the Virginia Fisheries Laboratory of the College of William and Mary, located at Gloucester, Virginia which receives financial support from the State Assembly (see page 56). Much of the work of the Laboratory is concerned with the oyster. Basic work has been accomplished for the guidance in shell plantings, in the evaluation of oyster repletion programs, elimination of oyster drills, and the development of new seed oyster areas. A co-operative study is in progress with the Chesapeake Biological Laboratory (see Maryland, page 30) on blue crab populations. In addition, several minor biological researches are being undertaken.

Publications

(1) Annual Report: Summarizes the work of the Commission of Fisheries and includes an appendix containing the annual reports of the Virignia Fisheries Laboratory (two annual reports published bi-annually).

Senior Officer

Commissioner (1950): C. M. Lankford

WASHINGTON

DEPARTMENT OF FISHERIES (Smith Tower, Seattle)

The research program of the Department of Fisheries is carried on mainly by two divisions, the Biology Division and the Technology Division, although the Hatchery Division also does some research on arti-

The biological investigations are concerned with population studies of the important commercial species and the sport fishery of Puget Sound which include salmon, oyster, clam, crab, and groundfish. Experimental work is being done in the rearing of certain species of salmon in salt water during their early life history. Research dealing with the inland game fisheries is undertaken by the State Game Commission.

Twenty-five to thirty biologists are employed on the research work and five biological stations are operated, the principal one being the Bowman's Bay Marine Biological Station at Anacortes.

One or two technologists are working on the utilization of neglected marine species, improvement in present methods of preservation, elimination of waste, and advisory services to the fishing industry.

Publications

(1) Annual Report: Summarizes the activities of the Department and includes technical reports.
(2) Biological Report (irregular): Contains reports on the results of scientific investigations.

Senior Officer

Director (1950): Vacant

WISCONSIN

DIVISION OF FISH MANAGEMENT, CONSERVATION DEPARTMENT (State Office Building, Madison)

Most of the biological research of the Division of Fish Management of the Conservation Department is concerned with problems affecting the game fish populations, but attention is also given to the commercial fish stocks of the Great Lakes. Experimental fishing studies are carried on, and life history investigations are in progress.

Publications

(1) Biennial Reports: Summarizes the work of the various divisions of the Conservation Department.

(2) Wisconsin Conservation Bulletin (monthly): Contains articles on conservation. (Published by the Conservation Department).

(3) Miscellaneous publications (irregular).

Senior Officer

Superintendent, Division of Fish Management (1950): Edward Schneberger

TERRITORY OF ALASKA

ALASKA FISH COMMISSION (Juneau)

The Alaska Fish Commission employs at least two biologists to carry on biological research. The investigations began in 1949, and initially the work has been with "catch per unit of gear" studies of the sablefish.

Publications

None to date

Senior Officer

Director (1950): C. L. Anderson

ALASKA FISHERIES EXPERIMENTAL COMMISSION (Juneau)

The Alaska Fisheries Experimental Commission employes about five chemists, home economists, and laboratory aides to carry on fishery technological research jointly with the U.S. Fish and Wildlife Service at its laboratory in Ketchikan. The research program is directed by the fishery technologist in charge of the Fish and Wildlife Service's laboratory.

Publications

No information

Senior Officer

Chairman (1950): Governor Ernest Gruening

TERRITORY OF HAWAII

DIVISION OF FISH AND GAME, BOARD OF AGRICULTURE AND FORESTRY (Honolulu)

For the biological research program, the Division of Fish and Game of the Board of Agriculture employs three biologists and also receives the assistance of the scientific staff of the Department of Zoology of the University of Hawaii in its investigations.

The research staffs are doing a great deal of work on the Hawaiian lobster. Other biological research includes: a study of the size composition, maturity, and food habits of the skipjack tuna, racial studies of the yellowfin tuna. Experiments are being conducted with a view to the introduction of fresh-water species, including the bluegill sunfish from the mainland and the true gourami from the Philippines. Much emphasis is also placed on improving commercial fisheries statistics. The Division and the University each maintain a research vessel. They also work closely with the Pacific Oceanic Fishery Investigations of the U.S. Fish and Wildlife Service.

Publications

(1) Report of the Board of Commissioners of Agriculture and Forestry (biennial): Summary of activities of the six divisions.
(2) Scientific Reports (irregular): Investigational reports of the Division of Fish and Game.

Senior Officer

Director, Division of Fish and Game (1950): V. E. Brock

PUERTO RICO

DIVISION OF FISHERIES AND WILDLIFE, DEPARTMENT OF AGRICULTURE AND COMMERCE (Division de Pesquerla y Vida Silvestre, Departamento de Agricultura e Comercio) (San Juan)

The Division of Fisheries and Wildlife of the Department of Agriculture and Commerce of the insular government conducts a small amount of fishery research. The Division operates a fresh-water fish hatchery at Maricao and some fish culture work is in progress. In this connection one or more fish ponds are used for experimental work and there is at least one biologist associated with the project. The Division has one exploratory fishing vessel which is currently engaged in a survey of the potential fisheries of the Caribbean region.

Publications

(1) Informe del Comisionado de Agricultura y Comercio (annual): Summary of activities of the Department of Agriculture and Commerce.

(2) Miscellaneous publications (irregular): Dealing mainly with laws.

Senior Officer

Chief, Division of Fisheries and Wildlife (1950): Miguel Melendez Ortiz

Universities and Colleges

Of the twenty-five or more universities and colleges in the United States which offer biological training in fisheries, only six specialize in one or more phases in this field. The remaining institutions fall into two groups, those which give partial training, but are developing and expanding facilities which may eventually provide specialized training, and those which offer fishery courses incidental to studies in general biology or wildlife management.

The University of Washington is the only school offering specialized training in fishery technology. Many other institutions offer courses of study for food technologists, but as far as can be determined, only three schools have curricula with special reference to the preservation of fishery products.

The universities referred to as offering biological and technological training in fisheries are here listed with a brief description of the type of training. The schools with partial training in fishery biology are given by name only.

UNIVERSITY OF WASHINGTON (Seattle, Washington)

Instruction and research in many phases of fisheries is carried on at the University of Washington by the School of Fisheries, the Oceanographic Laboratories, the Fisheries Research Institute, and the Applied Fisheries Laboratory. A description of the School of Fisheries and the Oceanographic Laboratories, which are primarily concerned with instruction, follows. The Fisheries Research Institute and the Applied Fisheries Laboratory are described in the section on Other Institutions (page 57).

The University of Washington is the only university in the United States with a separate school to teach fishery subjects. Students are able to obtain wider and more specialized fishery training at this institution than, perhaps, any other similar institution in the world. Undergraduate and postgraduate training, the latter leading to the degree doctor of philosophy, may be taken either in fishery biology or technology. Instruction in oceanography is given by the Oceanographic Laboratories, which, however, is a separate department.

The School of Fisheries offers three options for degrees in fisheries, (1) commercial fishery management, (2) fresh-water fishery management, and (3) fishery technology. Courses in the latter field deal principally with the processing and handling of fishery products and include canning, curing, refrigeration, preparation of by-products, etc.

In conjunction with various departments of the College of Arts and Sciences, the Oceanographic Laboratories, which are located on the university campus with a field station at Friday Harbor, San Juan Island, offer instruction and advanced scholastic research in the various aspects of oceanography and marine biology.

Publications

(1) Publications in Biology of the University of Washington (irregular): Scientific papers on the various biological sciences, including fisheries.

(2) Publications in Oceanography of the University of Washington (irregular): Consist of the "Contributions" which are short papers on various aspects of oceanography.

Senior Officers

Director, School of Fisheries (1950): W. M. Chapman (on leave)
R. Van Cleve (acting)
Director, Oceanographic Laboratories (1950): T. G. Thompson

UNIVERSITY OF MICHIGAN (Ann Arbor, Michigan)

Instruction and research in fisheries at the University of Michigan is handled by the Department of Fisheries in the School of Natural Resources. Teaching is in biology and centers about the improvement of fish production in inland waters through fisheries management. The curriculum leads to the degrees of bachelor and master of science, and doctor of philosophy.

The Department of Fisheries maintains a biological station and co-operates in the research and investigations carried out by the

Institute of Fisheries Research of the Michigan Department of Conservation which has its headquarters on the University campus (see page 31).

Publications

No information.

Senior Officer

Chairman, Department of Fisheries (1950): K. F. Lagler

UNIVERSITY OF HAWAII (Honolulu, Territory of Hawaii)

The Department of Zoology of the University of Hawaii offers biological training in fisheries leading to the degrees of bachelor and master of science, and doctor of philosophy. Particular attention is given to problems connected with the biological management of commercial fisheries. The Department also undertakes research projects, working closely with the Division of Fish and Game of the Territory of Hawaii and the Pacific Oceanic Fishery Investigations of the U.S. Fish and Wildlife Service (see page 21). The University, supplemented by private donations, supports the Hawaii Marine Laboratory at Coconut Island where the Department conducts much of its research and teaching.

Publications

(1) Research Papers (irregular): Papers on various research projects written by the "Cooperative Fisheries Research Staff" composed of officers of the University and the Hawaii Division of Fish and Game.

(2) Contributions (irregular): Miscellaneous investigations and reports of the Hawaii Marine Laboratory.

Senior Officer

Head of the Department of Zoology (1950): R. W. Hiatt

ALABAMA POLYTECHNIC INSTITUTE (Auburn, Alabama)

The Alabama Polytechnic Institute in the Department of Zoology-Entomology of the School of Agriculture, offers training in fish management leading to the degrees of bachelor and master of science. The academic work is principally for the training of students entering fresh-water fishery research and management, including pondfish culture. Facilities of the Alabama Agricultural Experiment Station, a station operated by the School of Agriculture, are available to the students for research projects. The latter conducts fresh-water fishery research investigations for the Alabama Department of Conservation.

Publications
(1) Circular (irregular): Reports on pondfish culture, fisheries management and other investigations undertaken by the Agricultural Experiment Station.
(2) Bulletin (irregular): Investigation report of the Agricultural Experiment Station.

Senior Officers
Head of the Department of Zoology-Entomology (1950): J. M. Robinson
Director, Alabama Agricultural Experiment Station (1950): M.J. Funchess

SCRIPPS INSTITUTION OF OCEANOGRAPHY (La Jolla, California)

Scripps Institution of Oceanography is an integral part of the University of California, Berkeley. Although the Institution was originally established for research in physical and chemical oceanography, biology of the ocean bottom, topography, and sedimentation, it is now actively engaged in the training of oceanographers. An extensive curriculum is available in the many aspects of oceanography, marine geology, chemistry, and other related subjects. Training leads to the degrees of bachelor and master of science, and doctor of philosophy.

The Institution carries on its own research and conducts investigations under contract for various government agencies. It is participating in the research program of the Marine Life Research Program concerning problems affecting the California sardine fishery. This program is being undertaken in co-operation with the Bureau of Marine Fisheries of the California Division of Fish and Game, the California Academy of Sciences and the U.S. Fish and Wildlife Service.

Publications
(1) Bulletin - Technical Series (irregular): Papers on results of various research projects.
(2) Contributions - New Series (annual): Papers which appeared in the year previous (and not yet published in the Bulletin or Records of Observation) on various phases of biology and research.
(3) Oceanographic Report (irregular): A special series prepared

by the Institution containing results of work carried out for the United States Department of the Navy.

(4) Progress Reports - Marine Life Research Program (planned to be quarterly; No. 1 was dated 1 May, 1949): Results of the co-operative California sardine fishery investigation.

(5) Records of Observation (irregular): Give reports of the cruises of the research vessel "E. W. Scripps."

Senior Officer

Director (1950): Roger Revelle (acting)

AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS (College Station, Texas)

The Department of Oceanography in the School of Arts and Sciences of the Agricultural and Mechanical College of Texas, which was established in 1950, offers a full curriculum in oceanography for graduate students working toward master's and doctor's degrees. The subject matter of oceanography has been divided into five major fields, biological oceanography, physical oceanography, geological oceanography, chemical oceanography, and marine meteorology, but an essential feature of the teaching program is the integration of these subjects.

Research comprises a large part of the academic program. Work at sea is conducted in co-operation with the U.S. Fish and Wildlife Service which operates an oceanographic vessel in the Gulf of Mexico. Research facilities are also available through the Texas A and M Research Foundation laboratory at Grand Isle, Louisiana. The Department co-operates in and carries on research for the latter institution (see page 55).

Publications

(1) Contributions (irregular): Miscellaneous reports and results of scientific investigations.

Senior Officer

Head of the Department of Oceanography (1950): D. F. Leipper

UNIVERSITY OF MASSACHUSETTS (Amherst, Massachusetts)

The curriculum of the Department of Food Technology in the School of Horticulture of the University of Massachusetts provides scientific and applied training in the principles concerned with processing, preservation, and packaging of foods products. Included in the curriculum is instruction in the preservation and handling of marine products. The food technology course leads to the degrees of bachelor and master of Science, and doctor of philosophy.

Publications

No information.

Senior Officer

Head of the Department of Food Technology (1950): C.R. Fellers

MASSACHUSETTS INSTITUTE OF TECHNOLOGY (Cambridge, Massachusetts)

The Department of Food Technology in the School of Science at Massachusetts Institute of Technology offers a broad training in food technology leading to the degrees of bachelor and master of science, and doctor of philosophy or doctor of science. The training is designed to provide students with a broad perspective in all the contributary sciences supplemented by the specific technological aspects of the food industries, and to fit the student for either the laboratory or production branches of these industries. The curriculum includes instruction in the preservation and handling of fishery products.

Publications

No information.

Senior Officer

Professor in Charge of the Department of Food Technology (1950): W. L. Campbell

OREGON STATE COLLEGE (Corvallis, Oregon)

The curriculum of the Department of Food Technology in the School of Agriculture at Oregon State College covers the broad field of food technology and food manufacture. Special instruction is offered in the preservation and utilization of fish and other marine products. For graduate and undergraduate research the Department maintains the Seafoods Laboratory at Astoria, to study problems in the preservation of marine food products. Studies include freezing and canning, with considerable emphasis given on the vitamin oils.

The training in food technology leads to the degrees of bachelor and master of science, and doctor of philosophy.

Publications

No information.

Senior Officer

Head of the Department of Food Technology (1950): E. H. Wiegand

Universities Offering Partial Training

Listed below are eighteen universities and colleges which either offer partial training in fishery biology or give fishery courses incidental to studies in general biology or wildlife management. Many of these schools are expanding their training in this field, notably Cornell University, University of Miami, and Indiana University. The department concerned and the address of the institution is noted for each.

1. California Institute of Technology (Division of Biology), Pasadena, California
2. University of California (Department of Zoology), Berkeley, California
3. Cornell University (Department of Conservation), Ithaca, New York
4. Harvard University (Department of Biology), Cambridge, Massachusetts
5. John Hopkins University (Department of Oceanography), Baltimore, Maryland
6. Indiana University (Department of Zoology), Bloomington, Indiana
7. University of Maine (Department of Zoology), Orono, Maine
8. University of Miami (Department of Marine Sciences), Coral Gables, Florida
9. Michigan State College (Department of Zoology), East Lansing, Michigan
10. University of Minnesota (Department of Zoology), St. Paul, Minnesota
11. Ohio State University (College of Agriculture), Columbus, Ohio
12. Oregon State College (Department of Fish and Game Management), Corvallis, Oregon
13. Rutgers University (Department of Zoology), New Brunswick, New Jersey

14. Stanford University (Department of Biological Sciences), Stanford, California
15. Agricultural and Mechanical College of Texas (Department of Fish and Game), College Station, Texas
16. College of William and Mary (Department of Biology), Williamsburg, Virginia
17. University of Wisconsin (Department of Zoology), Madison, Wisconsin
18. Yale University (Bingham Oceanographic Laboratory), New Haven, Connecticut.

Other Institutions

Many private and government sponsored institutions in the United States of America are engaged in marine and fresh-water research. Several are devoted exclusively to fishery research. Other carry on fishery work in conjunction with other activities. Finally, certain institutions do research which has direct application to fishery problems. An attempt is made to list those organizations devoted entirely to fishery research and the more important of those falling into the other categories.

The types of institutions listed include universities and colleges or organizations sponsored by them, privately endowed laboratories, and government sponsored institutes. Many of the universities and colleges noted in the preceding section are also engaged in various fields of fishery research. Their work has been mentioned already and they are not included here. In addition, there are many marine laboratories which are not specifically referred to, for their present research does not have direct application to fisheries. Such laboratories include:

1. The Allan Hancock Foundation for Scientific Research (University Park, Los Angeles, California)
2. Carolina Marine Laboratory of the Womans College of the University of North Carolina (Beaufort, North Carolina)
3. Duke University Marine Laboratory (Beaufort, North Carolina)
4. Gulf Coast Research Laboratory (Ocean Springs, Mississippi)
5. Hopkins Marine Station of Stanford (Pacific Grove, California

6. The Institute of Marine Science of the University of Texas (Port Aransas, Texas)
7. Louisiana State University Marine Laboratory (Grand Isle, Louisiana)
8. Marine Biological Laboratory of Florida State University (Alligator Harbor, Florida)
9. Oregon Institute of Marine Biology (Charleston, Oregon)
10. Pacific Marine Station (Dillon Beach, California)
11. Pomona College Biological Laboratory (Corona del Mar, California
12. Rutgers University Marine Laboratory (Cape May, New Jersey
13. Sister Lake Marine Laboratory (Houma, Louisiana)
14. Walla Walla College Biological Station (Anacortes, Washington)
15. William F. Clapp Laboratories (Duxbury, Massachusetts)
16. William G. Kirckhoff Marine Laboratory of the California Institute of Technology (Corona del Mar, California)

AMERICAN MUSEUM OF NATURAL HISTORY (Central Park at 79th St., New York, N.Y.)

The American Museum of Natural History was incorporated in 1869 to maintain in New York City a museum and library of natural history to encourage the study of natural science. One of the thirteen departments, the Department of Fishes and Aquatic Biology, with a staff of approximately six scientists, studies the broad aspects of evolution in fish and carries on taxonomic studies. Studies being presently carried on include those on Mexican cave fish, carangin fish, revision of the marlin, and the distribution and migration of tuna.

The Department of Fishes and Aquatic Biology maintains the Lerner Marine Laboratory at Bimini, Bahamas Islands (mailing address: 1105 du Pont Building, Miami, Florida). This laboratory has research facilities for the staff and guests and carries on studies in marine biology.

Publications

(1) Annual Report: Review of projects and acquisitions in the past year.
(2) Natural History (monthly): A magazine presenting articles of general interest on various aspects of natural science.
(3) Junior Natural History Magazine: A similar series, devoted to juvenile interests.

(4) Bulletin (irregular); Scientific records of explorations, and collections of the Museum of Geology, Paleontology, Mineralogy, and Zoology.
(5) Anthropological Papers (irregular): Discoveries, explorations, and researches in Archaeology, Anthropology, and Ethnology among extinct and living races of man.
(6) Novitates (irregular): Mainly descriptions of new forms in Zoology, Paleontology, Geology, and Mineralogy.

Senior Officer

Chairman and Curator, Department of Fishes and Aquatic Biology (1950): C. M. Breder

BEARS BLUFF LABORATORIES (Wadmalaw Island, South Carolina)

The Bears Bluff Laboratories supported by private gifts and funds from the State of South Carolina were incorporated in 1946 for the purpose of developing, through study, education, and research, the natural resources of that area of the South Atlantic Coast between Cape Fear, North Carolina and the entrance to St. John's River, Florida. Emphasis of the Laboratories' work is placed on fishery investigations for the State of South Carolina.

Since 1946, the staff of two or three biologists has been investigating the biological practicality of growing oysters in impounded waters. It is also conducting a survey of clam abundance and a study of new uses of shellfish by-products.

Publications

(1) Contributions (irregular): Reports on investigations and recommendations for future work.

Senior Officer

Director (1950): G. R. Lunz

BINGHAM OCEANOGRAPHIC LABORATORY OF YALE UNIVERSITY (New Haven, Connecticut)

The Bingham Oceanographic Laboratory of Yale University is primarily concerned with oceanographic and marine biological research. The Laboratory also gives limited instruction to students registered in the Department of Zoology who are doing special work related to fisheries.

The Laboratory maintains a collection of marine life obtained from a series of collecting expeditions it conducted in the late 1920's. Since then it has done hydrographic studies in co-operation with the Woods Hole Oceanographic Institution and is also co-operating with the U.S. Fish and Wildlife Service and Connecticut State Board of Fisheries and Game in certain fishery investigations. The latter are concerned with commercial trawl fishing of the Block Island Sound region.

Publications

(1) Bulletin of the Bingham Oceanographic Collection (irregular): Results of scientific investigations.
(2) Occasional Papers of the Bingham Oceanographic Collection (irregular): Results of scientific investigations.
(3) Memoir (irregular): Results of investigations conducted under auspices of Sears Foundation for Marine Research and Bingham Oceanographic Foundation.
(4) Journal of Marine Research (three numbers annually): Papers of an interpretative or theoretical nature on any kind of marine research.

Senior Officer

Director (1950): Daniel Merriman

CALIFORNIA ACADEMY OF SCIENCES (Golden Gate Park, San Francisco)

Two Departments of the California Academy of Sciences are engaged in fishery research. The Department of Ichthyology does taxonomic work and maintains a large collection of fish. The Department of Aquatic Biology operates the Steinhart Aquarium, conduct private research, and undertakes research for outside organizations. This department is responsible for the Academy's share of the California sardine investigation being conducted under the Marine Life Research Program, a co-operative project with the U.S. Fish and Wildlife Service, Scripps Institution of Oceanography, and the California Bureau of Marine Fisheries. The Academy is studying the physiology and behavior of the sardine.

Publications

(1) Academy News Letter (monthly): Notes of interest for its members of friends.
(2) Occasional Papers and Proceedings: Contain the Annual Report, and other notes of interest.

(3) Pacific Discovery (bi-monthly): Illustrated magazine, with articles on many aspects of natural science.

Senior Officer

Director (1950): R. C. Miller

CHESAPEAKE BAY INSTITUTE OF JOHNS HOPKINS UNIVERSITY (Baltimore, Maryland)

Located in Maryland is the Chesapeake Bay Institute, founded in 1949, and a division of Johns Hopkins University. It was established through state grants from Virginia (through the Virginia Fisheries Laboratory), and from Maryland (through the Department of Research and Education), and also through a grant from the Office of Naval Research of the U.S. Department of the Navy. The purpose of the three sponsoring organizations in establishing the Institute was to provide an organization for the study of physical and chemical hydrography of coastal and estuarine waters in general and Chesapeake Bay in particular. The research program embraces, in addition to the intense estuarial studies, an education approach to the problem, through the Institute's courses at advanced levels designed to ensure more and better trained scientists.

Publications

None to date.

Senior Officer

Director (1950): D. W. Pritchard

UNIVERSITY OF MIAMI MARINE LABORATORY (Coral Gables, Florida)

The University of Miami Marine Laboratory was established in 1942 to conduct fundamental research in tropical fisheries, marine biology, oceanography, and related fields. In connection with the Marine Laboratory, the University established in 1950 the Department of Marine Sciences which offers courses in fisheries, marine biology, and oceanography, both in the undergraduate and graduate school. The Laboratory in 1948 organized the Gulf and Caribbean Fisheries Institute, which annually brings together scientists, state and government officials, and representatives of the fishing industry for the purpose of discussing problems and developments connected with the fishing industries of the Gulf of Mexico and the Caribbean Sea.

Besides fundamental research, the Laboratory staff of about twelve scientists conducts basic and applied research on behalf of the United States Government, the State of Florida (see page 27), various West Indies Governments, and industrial organizations.

Publications

(1) Annual Report: Summary of activities.
(2) Proceedings of the Gulf and Caribbean Fisheries Institute (annual): Papers presented at the annual sessions.
(3) Miscellaneous publications (irregular):
(4) For Fisheries publications, see section on the Florida State Board of Conservation which publishes the results of the Marine Laboratory's work on Florida fisheries investigations (see page 27).

Senior Officer

Director (1950): F. G. Walton Smith

INSTITUTE OF FISHERIES RESEARCH OF THE UNIVERSITY OF NORTH CAROLINA (Morehead City, North Carolina)

The Institute of Fisheries Research of the University of North Carolina, with a professional staff of six scientists, at the end of 1949, is financed by the State of North Carolina and carries on investigations on the commercial fisheries resources of the State. In particular, it conducts biological research for the Division of Commercial Fisheries of the Board of Conservation and Development. Several investigations being undertaken are listed in the section devoted to the latter organization (see page 35).

Publications

(1) Semi-Annual Report: Summary of activities.
(2) Mimeographed Circulars (irregular): Information for the fishing industry.
(3) Special reports are planned to give results of investigations.

Senior Officer

Director (1950): W. A. Ellison, Jr.

SMITHSONIAN INSTITUTION (Washington 25, D.C.)

The Smithsonian Institution was established by the United States Government in 1846 for the increase and diffusion of knowledge by scientific research, exploration, and publication. It operates several agencies, including the National Museum. The primary purpose of the Department of Zoology, one of six departments within the National Museum is the collection, identification, and preservation of specimens representing natural history; it has one of the largest such collections in the world.

In the past two years, Museum officers have participated in the Bikini Scientific Resurvey, where extensive fish and invertebrate collections were made; and in the U.S. Navy's second 1948 Antarctic Development Project, resulting in a collection of marine invertabrates. In 1948, one officer made a survey of fisheries resources of the Persian Gulf and a survey of the fisheries resources of Guatemala was planned.

Publications

(1) Annual Report: Includes National Museum's Annual Report which reviews all divisions of its Department of Zoology.
(2) Bulletin (irregular): numbered monographs on various species or aspects of natural history.
(3) Proceedings (irregular): Shorter numbered papers on such subjects as: thrushes, mollusks, etc.

Senior Officer

Curator of Fishes (1950): L. P. Schultz

TEXAS A AND M RESEARCH FOUNDATION (College Station, Texas)

The Texas A and M Research Foundation, although independent of the Agricultural and Mechanical College of Texas, functions in cooperation with the latter (see page 46). It solicits contracts for research projects from industry and governmental sources. In the research programs undertaken, the Foundation may use the services of the personnel and facilities of any or all of the departments of the College.

With the co-operation of the Agricultural and Mechanical College of Texas the Foundation has done much work on the causes of oyster mortality in the Gulf of Mexico, involving investigations of chemical and physical factors, and biological conditions. In cooperation with the Department of Oceanography, it is making a study directed toward measuring the effects of certain newly discovered diseases of the oyster and the impact of these mortalities on the oyster industry.

Under contract with the Hydrographic Office of the United States Navy, the Foundation is directing a systematic survey of the Gulf of Mexico to procure information on oceanography and meteorology. The actual work is being conducted by the Department of Oceanography of the Agricultural and Mechanical College.

The Institution maintains a laboratory at Grand Isle, Louisiana, which serves as the field headquarters of the oyster research and is also used as a shore laboratory for the oceanographic work.

Publications

To date, the Foundation has published a few separates, however, it is understood more than 150 reports on various phases of oyster research have been filed and are in a process of revision with a view to ultimate publication.

Senior Officer

Executive Director (1950): A. A. Jakkula

VIRGINIA FISHERIES LABORATORY OF THE COLLEGE OF WILLIAM AND MARY (Gloucester Point, Virginia)

The Virginia Fisheries Laboratory of the College of William and Mary conducts biological fishery investigations for the Virginia Commission of Fisheries (see section devoted to the Commission for a brief description of the work being undertaken, page 38). The Laboratory's staff of four or five biologists also gives limited instruction in fishery subjects to students at the college through the Department of Biology.

Publications

(1) Annual Report: Summary of activities, two published bi-annually as an Appendix to the Annual Report of the Virginia Commission of Fisheries.
(2) Contribution Series (irregular): Results of research.
(3) Education Series (irregular): Scientific information of interest to the fishing industry and the public.

Senior Officer

Director (1950): J. L. McHugh

FISHERIES RESEARCH INSTITUTE OF THE UNIVERSITY OF WASHINGTON (University of Washington, Seattle, Washington)

The Fisheries Research Institute of the University of Washington was founded in 1947 and is presently financed by the Alaska salmon industry. Although the present activities of the Institute consist primarily of an extensive biological investigation of the Alaska salmon resources, the organization is set up to undertake any fishery biological or technological research problem.

The present research program which employs twenty to thirty biologists, seeks information necessary to provide a scientific basis for the management of the salmon resources of Alaska. The Institute co-operates in research programs with government agencies.

Publications

(1) Publications of the Fisheries Research Institute (irregular): Scientific papers.

Senior Officer

Director (1950): W. F. Thompson

APPLIED FISHERIES LABORATORY OF THE UNIVERSITY OF WASHINGTON (University of Washington, Seattle, Washington)

The Applied Fisheries Laboratory of the University of Washington is a co-ordinating center for research sponsored by the United States Government on the effects of radio-activity on marine organisms. Results of some of the investigations dealing with salmon are available in outside periodicals.

Publications

None to date. Results reported in outside periodicals.

Senior Officer

Director (1950): L. R. Donaldson

WOODS HOLE MARINE BIOLOGICAL LABORATORY (Cape Cod, Massachusetts)

The Woods Hole Marine Biological Laboratory is an autonomous institution dedicated to the promotion of biological research, by supplying investigators with facilities for their work, and by offering courses which contribute to the training of investigators. The main research building contains 85 private and general laboratories, and an extensive library.

The full facilities of the Laboratory are available only during the summer months. In July and August, lectures on topics of current biological interest are given by outstanding scientists. Research facilities can be provided for 375 investigators and their assistants. In addition, about 130 students are admitted each year to courses given in the following departments: zoology, physiology, marine botany, embryology, and experimental radiology. The Laboratory operates three supply departments which also furnish biological and chemical apparatus, and biological materials to outside organizations.

Publications

(1) Biological Bulletin (bi-monthly): Papers on the results of biological research, with one issue each year containing the Laboratory's Annual Report.

(2) Annual Announcement: Lists trustees, staff, standing committees, subscribing and co-operating institutions, and describes the research facilities, their use, and the courses offered.

Senior Officer

Director (1950): P. B. Armstrong

WOODS HOLE OCEANOGRAPHIC INSTITUTION (Cape Cod, Massachusetts)

The Woods Hole Oceanographic Institution, founded in 1930, is an autonomous research establishment, but it maintains close associations with universities (especially Harvard, Yale, Massachusetts Institute of Technology, and Brown University) and with agencies such as the U.S. Coast and Geodetic Survey, and the U.S. Coast Guard and Navy. The Institution's role as a center of co-ordination for oceanographic research, especially on the Atlantic Coast, is maintained by a wide representation on its Board of Trustees, and also on its staff which is usually appointed under a part-time arrangement in order to maintain constant co-operation of the various agencies.

Although formal instruction is not given at the Institution about twelve fellowships are granted annually for students to study there; a similar number act as assistants to members of the staff. It maintains a marine laboratory which serves as headquarters for its regular staff and for visiting investigators, and accommodates about one hundred workers. It operates four research vessels.

Primary emphasis at the Institution is placed upon specific projects directed by a permanent scientific staff. Some of the projects recently undertaken are: broad surveys of temperature and salinity distribution; studies on the productivity of the sea, and pollution of sea water; the geophysics of the continental shelves (under a grant of the Geological Society of America); and oceanographic investigations of the Caribbean Sea and the Gulf of Mexico (in co-operation with the Bingham Oceanographic Foundation of Yale University).

Projects sponsored by the U.S. Department of the Navy include: preparation of a comprehensive book reviewing all existing knowledge of fouling; studies in marine meteorology, underwater acoustics, and development of oceanographic instruments; distribution of marine sediments on that part of the Gulf of Maine lying immediately off Portsmouth; the hydrography of the Western North Atlantic; and the collection and analysis of data on the biology of the Pacific Ocean.

Publications

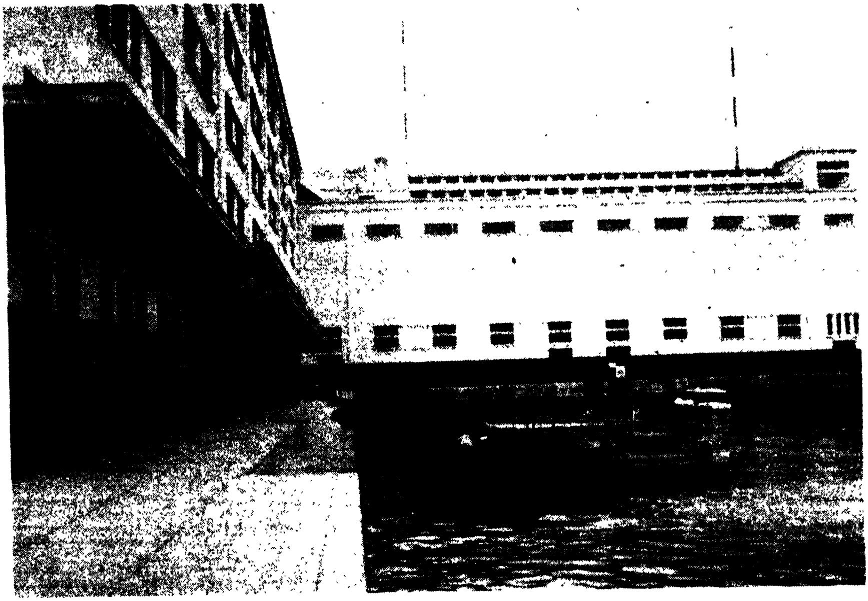
(1) Collected Reprints (annual): Collection of the year's written "Contributions" on various phases of research, and also containing the Institution's Annual Report.

(2) Papers in Physical Oceanography and Meteorology (irregular): Published in co-operation with the Massachusetts Institute of Technology: studies on wind, ocean currents, etc.

(3) Technical Reports (irregular): Results of specific oceanographic researches.

Senior Officer

Director (1950): E. H. Smith.



Building housing the offices, laboratories and fish market of the Federal Division of Fish and Game of the Department of Animal Production in Rio de Janeiro, D.F. Boats are shown at the landing for the market. Right wing of the building is used for storage of fish.

SOUTH AMERICA

ARGENTINA .

Federal Government Agencies

In Argentina, the fishery research program of the Federal Government is carried on mainly by bureaus of the Ministry of Agriculture and Live Stock, and the Ministry of Education. Work of the Ministry of Agriculture deals principally with fish culture while the Ministry of Education is concerned largely with faunal collections and marine biology.

The first organized fishery research in Argentina began in 1893 when La Plata Museum prepared a catalogue of fish of the country. Five years later the Ministry of Agriculture established a Division of Fish and Game which in 1903 began experimental work on the introduction of species of the family Salmonidae into Argentina's rivers and lakes. Since that time, fish culture research in conjunction with the artificial propagation and stocking of streams and lakes with trout, silverside, and other fresh-water species has been the principal activity. This work has been carried on by the many predecessor agencies of the General Bureau of Fisheries and Game which is now continuing it along with other research activities.

Marine research began much later than that concerned with fish culture. From 1896, the idea of establishing stations for such investigations was ever present. The idea materialized in 1928 when the Argentina Museum of Natural Sciences "Bernardion Rivadavia", under the Ministry of Education, established a hydrobiological station at Puerto Quequén. Prior to that time, the only marine research conducted was sporadic oceanographic work done by the Navy.

The Bureau of Fisheries and Game opened its first marine station, the Mar del Plata Marine Station, in 1942. This station has been concerned chiefly with fishery inspection work.

GENERAL BUREAU OF FISH AND GAME, MINISTRY OF AGRICULTURE AND LIVE STOCK (Dirección General de Pesca y Conservación de la Fauna, Ministèrio de Agricultura y Ganadería) (Buenos Aires)

The fishery research of the General Bureau of Fish and Game of the Ministry of Agriculture and Live Stock is chiefly on fish culture, but some technological and biological studies of the marine resources are also conducted.

The Bureau operates approximately ten fish culture stations and hatcheries for the artificial propagation of trout (Salmo spp., and Salvelinus sp.), silverside (Odonthestis spp.) and other fresh-water species. The biological research consists of improving methods of propagation and studies of the life history of the various species and their environment. The main center of the fresh-water research is the Rosario Hydrobiological Station (Estación Hidrobiológica de Rosario) located on the Paraná River outside the city of Rosario. Two other stations are the Fish Culture Station (Estación de Piscicultura) at Embalse, Córdoba, and the Trout Hatchery (Vivero de Salmónidos) at San Carlos de Bariloche, Rio Negra.

The Mar del Plata Marine Station (Estación Marítima de Mar del Plata) located at Mar del Plata was established in 1942 to undertake biological investigations on the marine fisheries, technological research, and to carry out certain inspection service. To date, the activities of the station have been principally concerned with the inspection of fishery products of the industrial plants in the area, but it has also initiated some oyster and mussel culture investigations, and technological research. Published reports do not indicate what is being done in the latter fields, except that studies are being made of the possibilities of oyster culture in the Gulf of San Matías.

Publications

(1) Publicación Miscelánea (irregular): Papers concerned chiefly with fish culture activities, published by the Ministry of Agriculture.

(2) Miscellaneous separates (irregular): Information articles, addresses, etc., dealing with fisheries, published by the Ministry of Agriculture.

Senior Officer

Director General, General Bureau of Fish and Game (1950): Raúl C. Sorzaburo

ARGENTINA MUSEUM OF NATURAL SCIENCES "BERNARDINO RIVADAVIA", SUBSECRETARIAT OF CULTURE OF THE SECRETARIAT OF EDUCATION (Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Subsecretaría de Cultura, Secretaría de Educación) (Buenos Aires)

The Argentina Museum of Natural Sciences "Bernadino Rivadavia" under the Subsecretariat of Culture of the Secretariat of Education maintains collections of fish, mollusks, and crustaceans, and does taxonomic work. It also operates the Hydrobiological Station at Puerto Quequén (Estación Hidrobiológica de Puerto Quequén) which carries on studies in marine biology and is open to visiting investigators.

Attached to the Museum is the National Institute for Investigations in the Natural Sciences (Instituto Nacional de Investigación de las Ciencias Naturales) which was established in 1948 with the aim of developing research programs relating to the utilization of natural resources. Nothing has been published to date to indicate the Institute's fisheries activities other than taxonomic studies.

Publications

(1) Monografías (irregular): Results of investigations by groups of specialists.

(2) Extensión Cultural y Didáctica (irregular): Original works and translations for the extension of culture and education.

(3) Extras (irregular): Series contains works published outside the Museum, for example papers presented at scientific congresses.

(4) Miscelánea (irregular): Works of interest to the museum not included in the first three series - memoirs, library catalogues, bibliographies, etc.

(5) Biblioteca Argentina de Ciencias Naturales (irregular): Translations of foreign papers on Argentina's natural sciences.

(6) Iconografías (irregular): Three iconographic series - Iconografía Botánicas (botany), Iconografía Geológicas (geology), Iconografía Zoológicas (zoology).

(7) Comunicaciones (irregular): Published in three series Ciencias Botánicas (Botanical Science), Ciencias Geológicas (Geological Science), and Ciencias Zoológicas (Zoological Science). Zoology papers to date contain results of taxonomic investigations.

(8) Revista (several numbers annually): Divided into three sections comparable to Comunicaciónes, each issue contains one or more scientific papers devoted to the natural sciences and information on the activities of the institution.

Senior Officer

Director, Argentina Museum of Natural Sciences "Bernardino Rivadavia" (1950): Agustin Eduardo Riggi

Universities and Other Institutions

Specialized academic training for fishery research workers is not available in Argentina. Fundamental courses in the biological sciences and other basic subjects are available at several universities, including the National University of Buenos Aires and the National University of La Plata. The former institution established a fishery school in 1949 which is operating on a trial basis, but the curriculum is of a general nature. The National University of La Plata maintains a museum and in conjunction with the latter there is an institute offering elective courses in limnology and oceanography to the university students. These universities also carry on some research associated with fisheries, but it is chiefly taxonomic work.

With the exception of the Argentina Oceanographic Institute (Instituto Oceanográfico Argentino), any private institutions concerned with fisheries matters deal principally with sport fish.

NATIONAL UNIVERSITY OF BUENOS AIRES (Universidad Nacional de Buenos Aires) (Buenos Aires)

The School of Fisheries (Escuela de Pesca) of the Faculty of Agronomy and Veterinary Medicine (Facultad de Agronomía y Veterinaria) of the National University of Buenos Aires was established in 1949 on an experimental basis. The training is for high school graduates and is for a two-year period. The following subjects are being offered: biology, taxonomy, sanitation, control of canned goods, fishing methods, preservation of fishery products, and fish culture practices.

Publications

(1) Revista de la Facultad de Agronomía y Veterinaria (irregular): Scientific studies and faculty news; nothing noted on fisheries to date. Various departments of the Faculty also issue series of bulletins containing scientific papers.

Senior Officer

Director, School of Fisheries (1950): Not known

MUSEUM OF NATURAL HISTORY, NATIONAL UNIVERSITY OF LA PLATA (Museo de Historia Natural, Universidad Nacional de la Plata) (La Plata)

The Museum of National History of the National University of La Plata carries on studies in marine biology and does taxonomic work with fish. An organization within the Museum, the Superior Institute of the Museum of the National University of La Plata (Instituto Superior del Museo de la Universidad Nacional de la Plata), is active in the same fields and also offers certain elective courses in limnology and oceanography.

Publications

(1) Anales (irregular): Monographs on the natural sciences including zoology; occasional papers on fisheries, usually taxonomic.

(2) Notas (annual volume): Organ of the Institute of the Museum; articles on the natural sciences presented by subject including zoology.

Senior Officer

Director, Museum of Natural History (1950): Emiliano J. MacDonagh

ARGENTINA OCEANOGRAPHIC INSTITUTE (Instituto Oceanográfico Argentino) (Buenos Aires)

The Argentina Oceanographic Institute was organized by prominent scientists to carry on oceanographic studies of the waters of the continental shelf. Results of some biological and physical oceanographical investigations have been published in outside journals.

Publications

None

Senior Officer

Director (1950): Adolfo D. Holmberg

BRAZIL

Federal Government Agencies

The fishery research program of the Federal Government of Brazil is carried on mainly by the National Department of Animal Production of the Ministry of Agriculture which also administers the fisheries resources of the country. The Department of Drought Control of the Ministry of Transportation and Public Works is also engaged in fishery research, but the latter's investigations deal solely with the improvement of fisheries in the man-made reservoirs and other inland waters of Northeast Brazil.

Government organized fishery research was initiated in 1915 when the Federal Government established the Marine Biological Station in Rio de Janeiro, D.F. This station only operated one year during which collections of marine fauna were made and some taxonomic work was done. Except for collections of fauna carried on by the hydrobiological station of the Oswaldo Cruz Institute and the National Museum operated by the Ministry of Education, the Federal Government did not resume biological work in connection with fisheries until 1933, shortly after the Division of Fish and Game was established within the National Department of Animal Production. About the same time, the Northeast Technical Commission on Fish Culture, now known as the Fish Culture Service of the Ministry of Transportation and Public Works became engaged in fish culture work. Since the inception of government biological programs connected with fisheries, investigations in fish culture have been the dominant field of activity.

DIVISION OF FISH AND GAME, DEPARTMENT OF ANIMAL PRODUCTION, MINISTRY OF AGRICULTURE (Divisao de Caça e Pesca, Departamento Nacional da Producão Animal, Ministério de Agricultura) (Rio de Janeiro)

The Division of Fish and Game of the Department of Animal Production under the Ministry of Agriculture is composed of five sections. The section of Research Supervision carries on the Division's research program. In 1950 the Division employed twenty to twenty-five biologists and seven technologists.

Although the research program includes some technological work such as the handling and preservation of fishery products, it is primarily concerned with biological investigations. The latter deal principally with fresh-water fish culture practices, the hatching and distribution of fry of warm-water species and the introduction of new species to certain regions of the country. Research on the commercial fisheries resources of the coast is negligible, being limited to the collection of specimens for the Division's Museum and some taxonomic work.

The Division operates a biological station, the Experimental Station of Biology and Fish Culture, (Estação Experimental de Biologia e Piscicultura), at Pirassununga in the State of São Paulo and four biological and fish culture substations known as experimental posts at Lagoa dos Quadros in the State of Rio Grande do Sul, at the Rural University (Universidade Rural), on the Rio-São Paulo road in the State of Rio de Janeiro, at the Botanical Gardens, (Jardim Botanico) in the city of Rio de Janeiro, and in the Bocaina Mountains (Serra da Bocaina).

The experimental station at Pirassununga in the State of São Paulo is studying and rearing certain species of cichlid introduced from northern Brazil and local species of characin and other warm-water species including Cichla multifasciata, Salminus maxillosus, Prochilodus hartii, Leporinus sp. Research is conducted as to the best methods of rearing such species and the most suitable areas for introduction. The substation at Lagoa dos Quadros has successfully introduced the silverside (Odonthestis bonariensis) into many streams and lakes of Rio Grande do Sul and other southern states where the species did not occur.

Publications

(1) Boletin (monthly): Published by the Ministry of Agriculture and contains articles of general interest on agricultural topics with occasional articles dealing with fisheries.

(2) Miscellaneous Reports (irregular): Includes reprints of articles prepared by the Division of Fish and Game staff, mimeographed reports on investigations, etc.

Senior Officer

Director, Division of Fish and Game (1950): João Claudio de Lima

FISH CULTURE SERVICE, DEPARTMENT OF DROUGHT CONTROL, MINISTRY OF TRANSPORTATION AND PUBLIC WORKS (Serviço de Piscicultura, Departamento Nacional de Obras Contra as Sêcas, Ministério de Viação e Obras Públicas) (Rio de Janeiro, D.F.)

The Fish Culture Service within the Department of Drought Control and under the Ministry of Transportation and Public Works has the responsibility of improving and developing the fisheries in the inland waters of Northeast Brazil through the stocking of these waters with appropriate species of fish. It carries on biological research in connection with this program at its headquarters in Fortaleza, State of Ceará.

When the Service started work in the early 1930's it investigated the possibility of stocking the reservoirs constructed for irrigation purposes. Native river species and species from the São Francisco River were introduced, but would not reproduce naturally in the reservoirs. Many attempts were made to overcome this difficulty and the staff had some success with the hypophysis method (injecting solution made from the hypophysis of other fish). The introduction of species from the Amazon River basin has proved more successful. These species spawn successfully in the man-made reservoirs.

The Fish Culture Service employed six biologists in 1950 and operated two hatcheries. The hatcheries are used for the rearing of six or more species from the Amazon for planting in the reservoirs. Published reports indicate that the operation is increasing the production of fish in the area.

Publications

(1) The Fish Culture Service prepares papers describing the results of its work. These papers are published in various outside periodicals and journals or in mimeographed form by the Service.

Senior Officer

Chief, Fish Culture Service (1950): Valdemar Carneiro de França.

NATIONAL MUSEUM, MINISTRY OF EDUCATION (Museo Nacional, Ministério da Educação) (Rio de Janeiro, D.F.)

The National Museum operated by the Ministry of Education carries on work in systematic zoology. Included in its work is the collection, identification, and preservation of aquatic fauna.

Publications

(1) Boletin de Museo Nacional (quarterly): Articles on the natural sciences by the Museum staff and other scientists. Contains book review section.

(2) Arquivos do Museo Nacional (irregular): Research papers on the natural sciences.

Senior Officer

Director, National Museum (1950): Heloisa Alberta Torres

State Government Agencies

Five or six of the twenty-one state governments in Brazil have official agencies dealing with fisheries, but according to published material, only the State of São Paulo carries on research. Three separate agencies are concerned and are listed below.

SAO PAULO

DIVISION OF FISH AND GAME, DEPARTMENT OF ANIMAL PRODUCTION, SECRETARIAT OF AGRICULTURE, INDUSTRY AND COMMERCE (Divisão de Proteção e Produção de Peixes e Animais Silvestres, Departamento de Produção Animal, Secretaría da Agricultura, Industria e Comercio) (São Paulo)

The Division of Fish and Game, a branch of the Department of Animal Production within the Secretariat of Agriculture, Industry and Commerce, employs six or more biologists to carry on fresh-water fishery research. The research program is concerned primarily with improving production in the inland waters, chiefly through fish culture methods. The Division operates a hatchery for the stocking of lakes and streams with edible species, using both native and exotic species. In addition, the staff is studying the biology of the important fresh-water food and game fish, carrying on pollution studies, and doing stream improvement work.

The Division of Fish and Game operates the School of Marine Fisheries (Instituto de Pesca Maritima), at Santos, for the academic and practical training of fishermen's children. Academic training is elementary while the practical work involves instruction in navigation, fishing methods, operation of fishing craft and engines, and other related subjects.

Publications

(1) Boletin de Industria Animal (irregular): Published by the Department of Animal Production and contains scientific papers, occasionally includes those related to fisheries. Also includes book reviews and news.

Senior Officer

Director, Division of Fish and Game (1950): Emilio Varoli

SÃO PAULO INSTITUTE OF OCEANOGRAPHY, DEPARTMENT OF ANIMAL PRODUCTION, SECRETARIAT OF AGRICULTURE, INDUSTRY AND COMMERCE (Instituto Paulista de Oceanográfia, Departamento da Produção Animal, Secretaría da Agricultura, Industria e Comercio) (São Paulo)

The São Paulo Institute of Oceanography operates under the Department of Animal Production of the Secretariat of Agriculture, Industry and Commerce. It was established in 1946 to carry out marine biological and oceanographic research, particularly related to fisheries as well as technological research in connection with the handling and preservation of fishery products. The organization still has only a small research staff (two or three) and to date has not issued publications indicating the type of work being conducted.

Publications

None to date

Senior Officer

Director, São Paulo Institute of Oceanography (1950): Vladimir Besnard

DEPARTMENT OF ZOOLOGY, SECRETARIAT OF AGRICULTURE, INDUSTRY AND COMMERCE (Departamento de Zoologia, Secretaría da Agricultura, Industria e Comercio) (São Paulo)

The Department of Zoology of the Secretariat of Agriculture, Industry, and Commerce carries on work in systematic zoology. Included in its work is the collection, identification, and preservation of aquatic fauna.

Publications

(1) Papeis Avulsos do Departamento de Zoologia (irregular): Scientific studies dealing with the natural sciences.
(2) Arquivos de Zoologia do Estado de São Paulo (irregular): Pamphlets containing research articles on the natural sciences.

Senior Officer

Director, Department of Zoology (1950): Oliverio Mario de Oliveira Pinta

Universities and Colleges

Specialized academic training for fishery research workers is not available in Brazil. Of the ten or more universities and colleges in the country, the University of Rio de Janeiro and the University of São Paulo offer fundamental courses in the biological sciences which would serve as prerequisites to specialized training in fishery research and management.

Other Institutions

As far as can be determined, the Darcy Vargas Fishery School is the only private institution dealing with fishery research or training. The work of this institution is confined to the training of fishermen.

DARCY VARGAS FISHERY SCHOOL (Escola de Pesca Darcy Vargas (Marambaia, Rio de Janeiro)

The Darcy Vargas Fishery School receives financial support from private charities as well as from the Federal Government, through the Division of Fish and Game. It is maintained for the practical and academic training of fishermen's children, with emphasis placed on the former. Academic training is elementary, while the practical training includes instruction in navigation, fishing methods, operation of fishing craft, and related subjects.

Publications

No information

Senior Officer
Director (1950): Not known

CHILE

Government Agencies

Government fishery research in Chile is undertaken entirely by the central government. The program is carried on by the Department of Fish and Game of the Ministry of Economy and Commerce, which administers the fish and game resources of the country. The Ministry of Educations operates the Museum of Natural History which carries on work in systemactic zoology, including the collection and identification of aquatic fauna.

Fishery research organized by the government is not extensive and deals with fish culture. The origin of this work was the establishment of two fresh-water fish culture stations in 1903 and 1914 respectively for the artificial propagation of fish and stocking of inland waters. Since that time, other stations have been established and the program now includes oyster and mussel culture. Work on oyster culture began about 1935 and mussel culture was initiated in the early 1940's.

DEPARTMENT OF FISH AND GAME, MINISTRY OF ECONOMY AND COMMERCE (Departamento de Pesca y Caza, Ministerio de Economía y Comercio) (Valparaiso)

The fishery research program of the Department of Fish and Game under the Ministry of Economy and Commerce is confined to biological work dealing with fresh-water fish culture, oyster culture, and mollusk culture.

Although the Department does not employ scientific personnel to carry on its fish culture and shellfish culture work, it employs a technical assistant to the director who is a biologist. The work is practical in nature and research is confined to improving the cultural practices.

The three fresh-water fish culture stations are located at Rio

Blanco, Lautaro, and Curico respectively. The hatcheries at these stations are concerned with the artificial propagation of several species, but principally trout, catfish, and silverside. Fry of these species are planted throughout the country.

Oyster culture is carried on at a station at Ancud, and mussel culture work at Castro, Island of Chiloe.

Publications

None

Senior Officer

Director, Department of Fish and Game (1950): Exequiel Rodriquez

NATIONAL MUSEUM OF NATURAL HISTORY, MINISTRY OF EDUCATION (Museo Nacional de Historia Natural, Ministerio de Educación) (Quinta Normal, Santiago)

The Museum of Natural History under the Ministry of Education carries on work in systematic zoology and maintains collections of aquatic fauna.

Publications

(1) Boletin del Museo Nacional de Historia Natural (irregular): Contains papers on the natural sciences.

Senior Officer

Director, Museum of Natural History (1950): Humberto Fuenzalida

INDUSTRIAL FISHING SCHOOL, GENERAL BUREAU OF PROFESSIONAL TEACHING, MINISTRY OF EDUCATION (Escuela Industrial de Pesca, Dirección General de la Enseñanza Profesional, Ministerio de Educación) (San Vincente, Talcahuano)

The Industrial Fishing School is operated by the Ministry of Education, through the General Bureau of Professional Teaching. The purpose of this school is to train young men in fishing, boat construction, and principles in the industrialization of fishery products. They are trained as fishing masters, boat carpenters, or industrial foremen. The course lasts four years.

Publications

None

Senior Officer

Director, Industrial Fishing School (1950): Froilan Carvallo

Universities and Other Institutions

Specialized academic training for fishery research workers is not available in Chile. Fundamental courses in the biological sciences and other necessary subjects are available, at several universities, including the University of Chile and the University of Concepción. Such basic courses would serve as prerequisites to specialized training in fishery research abroad.

There are no independent institutions devoted exclusively to fishery research. However, the Marine Biological Station, operated by the University of Chile, is engaged in research in marine biology and does some work directly associated with the fishery resources, and the Museum of Natural History at the University of Concepción carries on systematic work.

MARINE BIOLOGICAL STATION OF THE UNIVERSITY OF CHILE

(Estación de Biología Marina de la Universidad de Chile) (Casilla 13-D, Viña del Mar)

The Marine Biological Station of the University of Chile, located at Montemar, with a staff of four to six biologists, carries on research in marine biology. Some emphasis is given to fishery work. Included in the Station's program is a study of the biology of the spiny lobster in the Juan Fernández region and studies of Chile's algae resources.

Publications

(1) Revista de Biología Marina (three numbers annually): Contains papers reporting results of investigations, also reviews of scientific papers and gives developments in marine biology.

Senior Officer

Director (1950): Parmenio Yañez

MUSEUM OF NATURAL HISTORY, UNIVERSITY OF CONCEPCION

(Museo de Historia Natural, Universidad de Concepción) (Concepción)

The Museum of Natural History of the University of Concepción carries on faunal studies. Much of the work done is concerned with the systematics of fish and shellfish.

Publications

(1) Revista de la Universidad de Concepción (irregular): Contains articles on natural history, including those dealing with fish.

Senior Officer

Director, Museum of Natural History (1950): Not known

ECUADOR

Government Agencies

Fishery research organized by the Government of Ecuador and carried on by the Department of Fisheries and Fish Culture of the Ministry of Economy is not extensive and deals with fish culture. The origin of this work was the establishment of hatcheries for the introduction of rainbow trout from the United States of America in the early 1930's.

DEPARTMENT OF FISHERIES AND FISH CULTURE, MINISTRY OF ECONOMY (Departamento de Pesca y Piscicultura, Ministerio de Economia) (Quito)

The fishery research program of the Department of Fisheries and Fish Culture of the Ministry of Economy is presently confined to improving fish culture practices and limnological surveys. The Department operates approximately three fish culture stations for the artificial propagation of fish, chiefly rainbow trout.

Publications

None

Senior Officer

Director, Department of Fisheries and Fish Culture (1949): Jorge Ubidia Betancourt

Universities and Other Institutions

There is no published information available to indicate that universities or private research institutions are engaged in either fishery research or education.

PERU

Government Agencies

Government fishery research program in Peru is carried on by the Bureau of Fish and Game of the Ministry of Agriculture which was organized in 1949. The Bureau is organizing a research program. Formerly, the fishery research work was confined to investigations concerned with fish culture in the field of artificial propagation and the stocking of streams and lakes with fresh-water species.

BUREAU OF FISH AND GAME, MINISTRY OF AGRICULTURE (Dirección de Pesquería y Caza, Ministerio de Agricultura) (Lima)
The fishery research of the Bureau of Fish and Game of the Ministry of Agriculture covers the improvement of fresh-water fish culture practices, ecological studies on the marine fisheries, and technological work. The latter investigations have only been initiated for a year, and material has not yet been published to indicate what particular investigations are being undertaken.

The Bureau operates several fish culture stations for the stocking of streams and lakes with fish fry, chiefly trout in the mountainous streams where substantial commercial trout fisheries have developed. Minnows are also being reared for distribution in ponds and swamps to combat the malaria mosquitos.

Center for the marine biological investigations and the technological work is the Technological and Biological Laboratory (Laboratorio de Tecnología y Biología), located at Callao. The technological work includes inspection services, and studies on the development of new fishery products and fishing methods.

Publications

(1) Revista Agropecuaria del Perú (quarterly): Organ of the Ministry of Agriculture, containing articles on agricultural topics, fisheries included.

Senior Officer

Director, Bureau of Fish and Game (1950): J. Bell Taylor

Universities and Other Institutions

Available published information indicates that the universities in Peru are not directly concerned with fishery research or education. The same applies for private institutions.

URUGUAY

Government Agencies

Government fishery matters, including research, in Uruguay come chiefly under the Oceanographic and Fishing Service, a dependency of the Ministry of Industry and Labor. S.O.Y.P., as the service is commonly known, was founded in 1911, but it is only within the last few years that the agency has given attention to research. The Montevideo Museum of Natural History, operated by the government, carries on systematic studies, some of which are concerned with fish.

OCEANOGRAPHIC AND FISHING SERVICE, MINISTRY OF INDUSTRY AND LABOR (Servicio Oceanográfico y de Pesca, Ministerio de Industrias y Trabajo) (Montevideo)

The research program of the Oceanographic and Fishing Service of the Ministry of Industry and Labor includes both technological and biological work and is carried out by the Oceanographic Department (Departamento de Oceanografía). The technological work is concerned with improving the quality of fishery products and the methods of handling and distribution. Published information indicates that biological research consists of faunal, taxonomic, and general oceanographic studies. The Service employed three or four technical personnel in 1949.

Operating under S.O.Y.P. is the Oceanographic Museum (Museo Oceanográfico), which employed three biologists in 1949. The Museum maintains a fish collection, and carries on systematic studies and experiments in marine biology.

Publications

(1) Publicaciónes Cientificas (irregular): Reports on faunal and oceanographic studies to date.

(2) Miscellaneous publications (irregular): Separate publications of a scientific or informative nature.

Senior Officers

General Manager, Oceanographic and Fishing Service (1950): Hispano V. Perez Fontana

Head of the Oceanographic Department (1950): Fernando de Buen

MONTEVIDEO MUSEUM OF NATURAL HISTORY (Museo de Historia Natural) (Casilla de Correo 399, Montevideo)

The Zoology Section (Sección Zoológica) of the Montevideo Museum of Natural History carries on faunal and systematic studies. Published material indicates that attention is given to the fish fauna.

Publications

(1) Anales del Museo de Historia Natural de Montevideo (irregular): Monographs on the natural sciences including ichthyology.

(2) Communicaciones Zoológicas del Museo de Historia Natural de Montevideo (irregular): Papers devoted to systematic zoology and zoogeography of South America.

(3) Communicaciones Biológicas del Museo de Historia Natural de Montevideo (irregular): Papers devoted to the morphology, physiology, and ecology of animals.

Senior Officer

Director (1950): Ergasto H. Cordero

Universities and Other Institutions

Available published information does not indicate whether or not there are universities or other institutions concerned with fishery research or education. No doubt, the University of Uruguay offers fundamental courses in the biological sciences and related fields which are suitable prerequisites for specialized training for fishery research workers.

VENEZUELA

Federal Government Agencies

Three Federal Government agencies in Venezuela are concerned with fishery research. These are the Fisheries Section of the Bureau of Economic Agriculture under the Ministry of Agriculture and Live Stock, the Department of Fisheries of the Venezueland Development Corporation, and the Division of Agricultural Economics under the Bureau of Irrigation of the Ministry of Public Works.

Although fish culture work has been carried on in Venezuela for several years, it is only since the termination of World War II that the Government has taken measures to carry on research. One of the first steps in this direction was the establishment of the Caiguire Fishery Laboratory by the Fisheries Section early in 1948. The United States Fish and Wildlife Service provided a fishery biologist to initiate biological investigations dealing with the sardine of the Gulf of Cariaco at this laboratory.

FISHERIES SECTION, BUREAU OF ECONOMIC AGRICULTURE, MINISTRY OF AGRICULTURE AND LIVE STOCK (Sección de Pesquería, Dirección de Economía Agricola, Ministerio de Agricultura y Cría) (Caracas)

Biological research work of the Fisheries Section under the Bureau of Economic Agriculture of the Ministry of Agriculture and Live Stock is centered at the Caiguire Fishery Laboratory (Laboratorio de Pesquería de Caiguire) located at Caiguire, close to the fishing center of Cumaná on the Gulf of Cariaco. Initially, the investigations have been mainly concerned with statistical and biological studies of the sardine (*Clupanodon* or *Sardinella* sp.) of the Gulf of Cariaco. The laboratory is also making faunal surveys and carrying on taxonomic studies. It operates one research vessel.

Research on the fresh-water resources is confined to improving fish cultural practices. For the past fifteen years experiments have been carried on with stocking of such fish as black bass, carp, and perch in Lake Valencia. In addition to the stocking at Lake Valencia, trout are being planted in the lakes and streams of the Andes in the States of Trujillo, Merida, and Tachira.

In co-operation with the Department of Fisheries of the Venezuelan Development Corporation, a government sponsored corporation, the Fisheries Section plans to expand its biological research and also to carry on technological research and exploratory fishing investigations. Some technological work to improve the quality of salted and canned fish has been done by the Fisheries Section.

Publications

(1) El Agricultor Venezolano (monthly): Organ of the Ministry of Agriculture and Live Stock. Contains articles of an informative nature, with an occasional one on fisheries.
(2) Actividades Pesqueras en Venezuela (annual): Review of fisheries activities with statistical information on production, craft, fishermen, etc.
(3) Boletín Taxonómic del Laboratorio de Pesquería de Caiguire (irregular): Papers on taxonomic investigations published by the Fisheries Section.
(4) Contribuciónes Ocasionales de la Colección Ictiológica de Laboratorio de Pesquería de Caiguire: Notes on fish collected by the fishery laboratory.

Senior Officer

Chief, Fisheries Section (1950): Pedro Arocha Brito

VENEZUELAN DEVELOPMENT CORPORATION (Corporación Venezolana de Fomento) (Caracas)

The Venezuelan Development Corporation is an autonomous organization established by the Venezuelan Government in 1946 to raise national production in every field by giving financial and technical assistance both to industry and individuals. Among its several departments is the Department of Fisheries (Departamento de Pesca) which co-operates with the Fisheries Section of the Ministry of Agriculture and Livestock in the research program of the latter.

Publications

(1) Miscellaneous publications (irregular): Information on the activities of the Corporation

Senior Officer

Head of the Department of Fisheries (1950): Roberto Gabaldón

DIVISION OF AGRICULTURAL ECONOMICS, BUREAU OF IRRIGATION, MINISTRY OF PUBLIC WORKS (División de Agroeconomía, Dirección de Obras de Riego, Ministerio de Obras Públicas) (Caracas)

The Division of Agricultural Economics of the Bureau of Irrigation under the Ministry of Public Works plans to establish a fish culture service similar to that operating in Northeast Brazil. The service is to improve and develop the fisheries of inland waters in conjunction with irrigation and reclamation projects.

Publications

None to date dealing with fisheries.

Senior Officer

Not known

Universities and Other Institutions

It is not possible to ascertain from published information the names of universities or private institutions in Venezuela concerned with fishery research. Undoubtedly a few institutions do carry on marine faunal studies and maintain collections of fish.

INTERNATIONAL AGENCIES

There are six international agencies located in North America which are concerned with fishery research. Five of these organizations are international fisheries commissions, which resulted from the need for joint research programs for the conservation of marine fisheries resources. The sixth organization is the Caribbean Commission. Although the latter is not engaged in fishery research, it does lend its support to such projects in the Caribbean area.

INTERNATIONAL FISHERIES COMMISSION (School of Fisheries, University of Washington, Seattle, Washington, U.S.A.

The International Fisheries Commission, established in 1924 by a treaty between Canada and the United States of America, is responsible for the investigation and regulation of the Pacific halibut fishery.

After its establishment, the Commission instituted a practical program of investigation. Biologists made fundamental studies of the life of the halibut, examined the history of the fishery and the condition of the available stocks, made studies of the adult and larval stocks, and collected and analyzed biological statistics. The purpose of these investigations was to learn the relationship between the catch and the accumulated stock in order to formulate regulations for the fishery.

Present research, conducted by a staff of approximately six full-time biologists, is concerned principally with the collection and analysis of biological statistics which form the basis of the fishing regulations. However, present investigations are also designed to supplement the earlier scientific research.

Publications

(1) Report of the International Fisheries Commission (irregular): One number issued annually since 1948 containing the Annual Report, others contain scientific papers dealing with results of investigations.

Senior Officer

Director of Investigations (1950): H. A. Dunlop

INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION (New Westminster, British Columbia, Canada)

The International Pacific Salmon Fisheries Commission, established in 1937 by a treaty between Canada and the United States of America, is responsible for the investigation and regulation of the sockeye salmon fishery of the Fraser River system.

During the first twelve years, investigations were primarily concerned with the adult phase of the life history of the sockeye. The initial research was designed to determine the cause of the depletion of the various runs spawning in the tributaries of the Fraser River, to learn the relationship between the catch of the commercial fishery and the escapement to the spawning streams, and to determine the time and speed of migration of the various races or populations through the commercial fishing areas (in the coastal waters and lower river) to the spawning grounds. Also, the work was directed towards the removal of obstructions to the migration of sockeye and the promulgation of regulations. The staff of approximately twelve full-time biologists and six engineers is continuing this work, but in addition, attention is now being given to the rehabilitation of barren streams, the selective action of different commercial gears, and the study of the early life history of the species.

Publications

(1) Annual Report: Summary of activities.
(2) Bulletin (irregular): Scientific papers reporting results of investigations.
(3) Miscellaneous publications (irregular).

Senior Officer

Director of Investigations (1950): L. A. Royal

INTERNATIONAL COMMISSION FOR THE SCIENTIFIC INVESTIGATION OF TUNA (Headquarters not yet established)

The International Commission for the Scientific Investigation of Tuna resulted from a convention between the United States of America and Mexico, which was ratified in 1950. The director of investigations and the scientific staff have not yet been appointed.

The Commission is to engage in the scientific investigations of the tuna and tuna-like fish of the eastern Pacific Ocean, as well as those species of fish which are used for bait in the tuna fisheries. The information is to be used to facilitate maintaining the populations of these fish at a level which will permit the maximum reasonable utilization without depletion.

Publications

None to date.

Senior Officer

Director of Investigations (1950): Not appointed to date

INTER-AMERICAN TROPICAL TUNA COMMISSION (Scripps Institution of Oceanography, La Jolla, California, U.S.A.)

The Inter-American Tropical Tuna Commission was established by a convention between Costa Rica and the United States of America, which was ratified in 1950. The director of investigations was appointed in December 1950.

The Commission is to undertake the scientific investigation of the yellowfin and skipjack tuna and bait fish in the tropical waters of the eastern Pacific Ocean in the fisheries maintained by the nationals of the two countries. Other kinds of fish taken by tuna fishing vessels may also be studied by the Commission.

Publications

None to date

Senior Officer

Director of Investigations (1950): M. B. Shcaefer

INTERNATIONAL COMMISSION FOR THE NORTHWEST ATLANTIC FISHERIES (Headquarters not yet established)

The International Commission for the Northwest Atlantic Fisheries came into existence in the spring of 1950 with the ratification by four governments of a convention drawn up by Canada, Denmark, France, Iceland, Italy, Norway, Portugal, Spain, the United Kingdom, and the United States of America. The primary function of the Commission is to collect, collate, and disseminate scientific information on international fisheries in the convention area, which covers the waters off the West Coast of Greenland, Labrador, Newfoundland, Nova Scotia, and the New England States. However, provision is made for the scientific staff to supplement the investigations of the research agencies of the countries concerned.

Publications

None to date

Senior Officer

Executive Secretary (1950): Not appointed to date

CARIBBEAN COMMISSION (Port-of-Spain, Trinidad, British West Indies)

The Caribbean Commission is a consultative and advisory body established in 1946 by France, the Netherlands, the United Kingdom, and the United States of America, whose purpose is to improve the status of the people of the Caribbean. It is the successor to the Anglo-American Caribbean Commission which was formed in 1942 by the United States and the United Kingdom.

There are two auxiliary bodies of the Commission: the Caribbean Research Council and the West Indian Conference. The Research Council considers the research problems of the area and recommends action to the Commission, including the undertaking of research assignments. The Research Council has a number of research committees, including the Committee on Agriculture, Nutrition, Fisheries, and Forestry.

The Commission has lent support to a number of research projects related to fisheries, chiefly through the publication of the results of fisheries surveys and comprehensive scientific memoirs.

Publications

(1) Annual Report: Summary of activities.
(2) Fisheries Series (irregular): Information on fisheries resources.
(3) Trade Bulletin (irregular): Fisheries products as well as those on agriculture.
(4) Miscellaneous (irregular): Includes "Year Book of Caribbean Research."

Senior Officer

Secretary-General (1950): L. W. Gramer